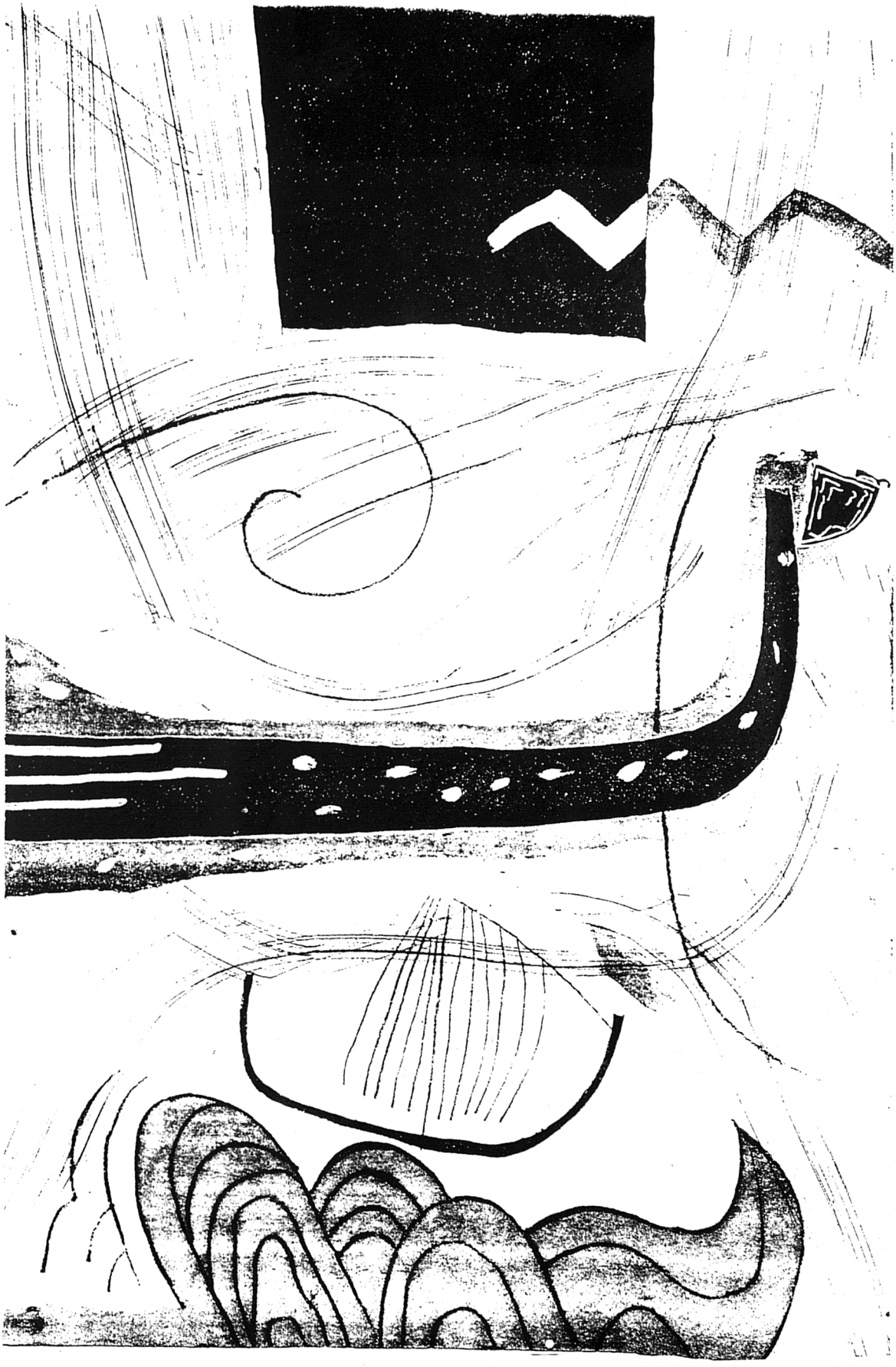

Sails in St. Magnus Exhibition, Tankerness House Museum (Copyright: Artist)

Abstract

Anne Allen

The Maritime Cultural Landscape of Viking and Late Norse Orkney

From the ninth to the fifteenth centuries AD the Orkney islands were the base of a Norse Earldom that encompassed Shetland, Caithness and, from time to time, part of the western seaboard of Scotland. Maritime communication provided the key to maintaining control over this territory and the majority of settlements lay close to the sea, near landing places. The archaeological record of the period comprises distinct maritime structures (such as jetties, slipways and boathouses), artefacts (boats, fishing equipment) and ecofacts (exploited marine resources such as shellfish, fish, sea mammals and seaweed). Together with historical, toponymic, ethnographic and geographical sources, the latter constitute the material evidence of a maritime cultural landscape.

This thesis explores the nature of Orkney's maritime cultural landscape. The approximate medieval coastline is reconstructed and a gazetteer of known sites from the period is compiled from both published and unpublished sources. New evidence is presented of a maritime economy which was based upon the exploitation of the sea, both for inter-island and long-distance trade and communication, and as a source of food. The types of boats involved in this communication are also assessed. Appendices offer up-to-date lists of calibrated radiocarbon dates, a quick-reference guide to indigenous and imported goods and a list of Viking boat finds from Britain and Ireland.

The Maritime Cultural Landscape of Viking and Late Norse Orkney

Anne Allen (née Bowman)

Thesis submitted for the degree of PhD

Department of Archaeology

University of Durham

1995

Declaration

No work in this thesis has previously been submitted for a degree in this or any other university. The thesis is based entirely upon the author's own research and not upon any joint work.

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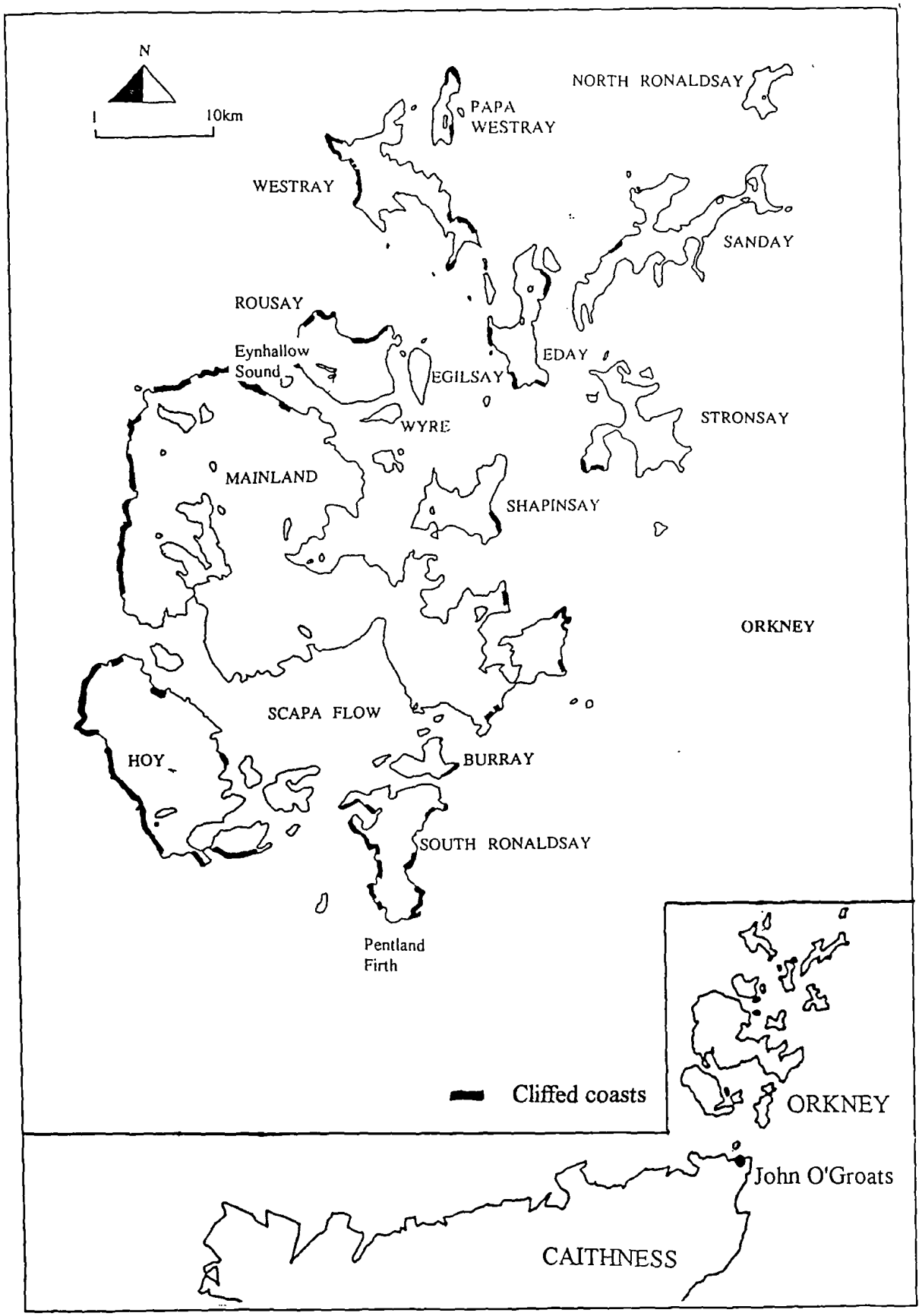

Figure 1 Orkney: location

Foreword

Orkney is a group of approximately sixty islands and skerries lying to the north of Scotland and separated from the mainland by the narrow Pentland Firth (figure 1). Historically, from the ninth to the fifteenth centuries AD the islands were the base of a Norse Earldom that encompassed Shetland, Caithness and, from time to time, part of the western seaboard of Scotland. The Earldom was a Norwegian province, though following a treaty between the Kings of Scotland and Norway in 1098 the earls governed Caithness on behalf of the King of Scotland (Crawford, 1977). The sovereignty of Orkney and Shetland (by then in Danish hands) was officially relinquished to Scotland *ca.* 1468/9 as part of the dowry of Princess Margaret, daughter of Christian I of Denmark and Norway, in her marriage to King James III of Scotland. In fact Scottish nobles of the Sinclair line had held the Earldom since the middle of the thirteenth century.

In maintaining political control over a territory that extended some 200 miles from Shetland to Caithness, and 400 miles from Shetland to the Western Isles, the existence of a network of maritime trade and communication routes was crucial. By analysing archaeological, historical, toponymic, ethnographic and geographical sources this thesis aims to demonstrate the existence in Viking and Late Norse Orkney of a *maritime cultural landscape* comprising *maritime structures* (such as boat houses, slipways, harbours, jetties and sea marks), *maritime artefacts* (boats and fishing equipment) and *maritime ecofacts* (exploited marine resources such as shellfish, fish, sea mammals, seaweed and driftwood). The main objectives are :-

1. To produce a record of and to evaluate the range of maritime structures, settlements and other types of archaeological site that existed.
2. To show that the settlement pattern was coastal.
3. To investigate the extent of coastal change since the Viking period and to explore how coastal change today might contribute to the effective management of sites.
4. To demonstrate that marine resources were an important part of the diet.
5. To show that inter-island and long distance exchange were fundamental to the economy of that period.
6. To describe and analyse the range of Viking boats found in Orkney, their technology, uses and performance characteristics and to investigate the evidence for a continuity of the Viking tradition in recent vernacular boat building.
7. To make recommendations for future work.

The *maritime cultural landscape* is not a new phrase. In Scandinavia it is commonly used to describe the physical remains of traditional coastal communities practising a mixed fishing-farming economy (Jones, 1985), as well as the tangible and intangible remains of ancient maritime economies (Westerdahl, 1989). It can also refer to any area of coastline, an area of land inundated by the sea or an area of *maritime cultural heritage* prescribed mainly for modern management purposes (Westerdahl, *op. cit.*; Firth, 1994). Throughout this thesis I use the term in the restricted sense of a geographical area which lies close to the sea and whose material culture and economy reflect that proximity.

There are seven chapters. Chapter 1 outlines some previous approaches to the study of Viking and Late Norse Orkney, establishes the theoretical frameworks for the present work, defines terms such as maritime and coastal, and considers the archaeological study of islands. Drawing on a range of sources (archaeological, toponymic, ethnographic and historical) chapter 2 then establishes the range of maritime structures within the maritime cultural landscape, their context in Orkney and parallels in other Norse colonies. In studying the maritime landscape it is obviously essential to know the position of the coast. The process of reconstructing the medieval coastline of Orkney is the subject of chapter 3. Coastal change has important implications for heritage management today and these are also outlined. The evidence for a marine resource-based subsistence economy, inter-island and long-distance networks of exchange, trade and communication, are investigated in chapters 4 and 5. In December 1991 a small Viking boat burial was discovered on the island of Sanday. This is one of four boats found in the Orkney Earldom. None of these has previously been published in detail. Reports on all four appear for the first time in chapter 6, together with an analysis of historical and other evidence for the range of boats used in Viking and Late Norse Orkney and the possible existence of a naval levy system. Conclusions and suggestions for future work are presented in chapter 7.

This thesis is the product of research conducted by the author between 1991 and 1994 at the Department of Archaeology, University of Durham. It involved four seasons of fieldwork in Orkney: the excavation of a Viking boat burial in December 1991; a survey of vernacular boats in the islands during August 1992; and coastal surveys in May and June 1993 and 1994. In addition, much of the information presented in chapter 5 about small Viking boat finds in Norway, was collected during a research trip to Oslo, Bergen and Trondheim in April and May 1992. The gazetteer in appendix 1 derives in part from the Orkney Sites and Monuments record, now located in Stromness, Orkney, and the National Monuments Record for Scotland in Edinburgh. The National Map

Libraries in Edinburgh and London made available maps used in the analysis of coastal change in chapter 3.

During the course of this work interim papers were presented at several places: Medieval Discussion Group, University of Durham; Postgraduate Seminars, University of Durham; Scottish Institute of Maritime Studies, University of St Andrews; Scottish Trust for Underwater Archaeology, University of Edinburgh; Nautical Archaeology Society, Institute of Archaeology, London; International Medieval Congress, Leeds; Medieval Europe Conference, York.

Note on terminology

The chronological terminology needs some explanation since several different terms are used to describe the same period. To distinguish between the initial phase of settlement up to the mid eleventh century and the following two centuries Morris (1985, 211) used the terms *Viking* and *Late Norse*. Hunter (1986b, 71-2) preferred the umbrella term *Norse* for the whole period since there is little discernible change in the archaeological material culture, but he recognised a distinction in the initial stage of settlement, perhaps warranting the term *Scandinavian*. Lamb and Turner (1991, 170) considered the use of such terms as detrimental to understanding the islands' wider European context in what was, in fact, the *High Middle Ages*. In the same vein, Stoklund (1984, 97) would call the period from about 1100 to 1350 the period of *Europeanisation*. Throughout this thesis I use the terms *Viking* and *Late Norse* following Morris' convention, but without intending any cultural connotation. The whole period is embraced by the Medieval period:

5th to 9th centuries - Early Medieval / Late Iron Age
9th to mid 11th centuries - *Viking* period
11th to 13th centuries - *Late Norse* period
14th to 15th centuries - Late Medieval
16th to 17th centuries - Post-medieval

Words in italics can be found in the glossary.

Acknowledgements

The author wishes to extend her thanks to her supervisors, Dr. Helena Hamerow and Dr. Martin Millett, and to the various colleagues and friends who have readily supplied information, often unpublished, and who have offered assistance, advice and criticism of her work at various stages of development: Mr. Simon M. Allen; Barrie Andrian; Patrick Ashmore; Dr. Colleen Batey; Dr. Gerald Bigelow; Dr. Jan Bil; Charlotte Blindheim; Alan Braby; Anne Brundle; Dr. Chris Caple; John Casey; Carl Olof Cederlund; Dr. Arne Emil Christensen; Dr. Gordon Cook; Dr. Barbara Crawford; Dr. Peter Crew; Ole Crumlin-Pedersen; Magnar Dalland, Dennis Davidson; Martin Dean; Dr. Nick Dixon; Robbie Duncan; Thomas Eggeling; Prof. Emeleus; Oddmunn Farbregd; Öystein Færöyvik; Tony Firth; Howie Firth; Alison Fraser; Tor Gardåsen; Louisa Gidney; Damian Goddard; Stan Goldman; Damien Goodburn; Dr. David Griffiths; Dan Grieves; Arild Hanson; Pippa Henry; Birgit Heyerdahl-Larsen; Jim Hooker; Dr. John Hunter, Phil Howard; Professor Hubert H. Lamb; Dr. Raymond Lamb; Dr. Chris Lowe; Ingrid Mainland; Dr. Colin Martin; Professor Sean McGrail; Dr. John McKinnell; Jack Moodie; Jeppe Möhl; Professor Christopher D. Morris, Dr. Ian Morrison; Björn Myhre; Adrian Osler; Ian Oxley; Olwyn Owen; Dr. Robert Prescott; Andi Ross; Dr. Peter Rowley-Conwy; Alan Scarth; Mike Spearman; Dr. Sue Stallibrass; Michael Teisen; Rachel Tyson; Eli Ulriksen; Harvey Watt; Tommy Watt; Christer Westerdahl; Len Wilson; Bryce Wilson and Trevor Woods.

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Finally, I would like to thank my husband and family for their support and forbearance during the last three and a half years.

CHAPTER 1 INTRODUCTION: The Concept of a Maritime Cultural Landscape

1.1 The Concept of the Maritime Cultural Landscape

The *cultural landscape*, as distinct from the *natural landscape*, describes an environment created by anthropogenic factors (Taylor, 1987), including everything from a concrete-built metropolis to an apparently natural heathland or bog which was created by deforestation. It refers both to present day landscapes and reconstructed past landscapes. Easy to define, the adjective "maritime" meaning "close to the sea" and "relating to ships and the sea", is more difficult to measure. The *natural maritime landscape* extends from the sea to the landward limits of maritime heath or areas of blown sand. The *maritime cultural landscape*, however, is much more diverse. It also encompasses inter-tidal areas or land which is now submerged due to coastal change, together with habitation sites which lie hundreds of metres inland, but which were evidently dependent upon the sea for their livelihood. Similarly some sites which now lie close to the sea were originally built much further away and may be indistinguishable from inland sites (Ashmore, 1993, 2). Legislative and management boundaries add a further complication, since they often bear no relation to natural or archaeological definitions, but relate to the coast here and now (Firth, 1994).

Christer Westerdahl (1989) used the term *maritime cultural landscape* in his study of an area of northern Roslagen in Sweden, his intention being to raise awareness of the existence of an *underwater cultural heritage* of wrecks and submerged *maritime structures* such as ballast sites and slipways. In fact, he found that this maritime landscape was culturally distinct in its range of structures, artefacts and ecofacts. Drawing on a combination of sources (archaeological, place-name, oral tradition, historical and ethnographic) he was able to identify three distinct cultural zones which roughly equated to the terms of transport geography: *waterfront*, *coastal* and *inland*. Each zone was linear in relation to the coastline or river to which it pertained. The *waterfront* zone was about a kilometre wide and the *coastal* zone extended to fifty kilometres from the nearest shore with the *inland* zone lying beyond it. Westerdahl (1994) now goes so far as to identify sub cultures within these regions on the basis of boatbuilding traditions, place names and cultural relations. Sognnes (1981) considered the relationship between coastal and inland areas in western Norway during the Viking period. She devised a similar model of three distinct economic zones parallel to the coast.

The cultural landscape of Westerdahl's *waterfront* and Sognnes' *coastal* zones represents the physical remains of the maritime or *coastal communities* whom Muckelroy (1978, 6) saw as being distinct from terrestrial communities in their use of nautical

technology, naval warfare, maritime trade and distinct shipboard societies. Of course, the concept of a maritime cultural landscape is in one sense merely an abstraction of general culture (Westerdahl, 1994), but in Viking and Late Norse Orkney it is more than just a means of describing people's penchant for a sea view or for seafood, still less merely a means of delineating a geographical area of research. For example, throughout the Norse world ships and boats played an important symbolic role. They were depicted in boat graves, ship settings, saga tales. Some were personified with dragon heads. They were highly prestigious as well as practical objects, held in a similar regard to modern day motor cars, perhaps (Crumlin-Pedersen, 1992b, 10). Ships and boats occur more frequently in iconographic sources than any other motif (Crumlin-Pedersen, 1992a). Following the introduction of Christianity to the Norse homelands and colonies ships were often depicted alongside crosses (Crumlin-Pedersen, 1992a). Burial in boat graves was reserved for the wealthy (at least in terms of associated grave goods) and was evidently part of a religious cult (Müller-Wille, 1970).

Island Archaeology

None of the sites in the gazetteer (appendix 1) lies more than three kilometres from the sea today. The whole of Orkney would therefore fit within Westerdahl's *coastal zone*, and the majority of sites (see below, 2.1.2) within his *waterfront zone*. This makes Orkney an ideal place to assess the influence of the proximity of the sea on the cultural landscape. But Orkney is also a group of islands and this too is significant.

Islands are often considered ideal "laboratories" for archaeological study, since they are by nature isolated. Their boundaries often delineate discrete ecosystems and they share certain common properties: distance, configurational and area effects (Keegan & Diamond, 1987, 49). The distance principle states that in general individual islands and island groups are likely to maintain a permanent population if they are close to a source of new immigrants; and that islands with limited resources may be inhabited provided that alternative supplies are available nearby. Configurational effects explain the colonisation and use of islands as stepping stones on route to other islands or continents. The Orkney islands were particularly well situated in this respect, lying on the maritime route from Norway to Scotland and Ireland. The area principle supposes that larger islands were colonised before smaller ones. It is not known if this was the case in Orkney.

Orkney cannot be described as isolated either geographically or culturally. The southernmost tip of South Ronaldsay lies just six and a half miles from Duncansby Head, Caithness, and the sea, far from being a barrier, linked the islands with the neighbouring Scottish littoral which shared a common material culture. In reality, central Scotland

was more of an island in the conventional sense than either the Northern or Western Isles.

This is true also of the islands' natural history. The diversity recognised in the biogeography of 'islands' within terrestrial areas, where similar habitats in different areas are inhabited by different flora and fauna, is not the case in Orkney or other maritime islands linked by flows of currents (Dunnet, 1994, 2). There each island has a similar range of species.

There is an extensive theoretical literature on both island archaeology and biogeography. Much of this is based on the concept of isolation. Renfrew & Wagstaff (1982) and Renfrew & Cherry (1986) considered the Greek islands, distinct from one another both physically and in their cultural and socio-political organisation in the Bronze Age, as ideal case-studies of 'peer-polity' interaction. That this model does not apply to all Greek islands was demonstrated more recently by Cherry *et al* (1991), based on the island of Keos. Ethnographic studies also show island communities to be just as complex and diverse as their terrestrial counterparts (Kirch (ed.) 1986; Kirch 1986).

Recent studies of island ecology now show that the issue of diversity versus similarity in maritime environments is complex. The Western Isles of Scotland, for example, share broadly the same molluscan population, but their genetic structure changes every few hundred metres along the coast (Todd *et al*, 1994).

None of the archaeological studies cited above are close either temporally or spatially to Viking and Late Norse Orkney, and their contribution to the present work is simply to emphasise that whilst islands apparently offer geographically well-defined study areas, these do not necessarily equate with either cultural or biological boundaries. All islands are not the same; each must be judged in its own context.

Orkney displays some characteristic isolated island traits - such as certain mutations caused by in-breeding, or continuity in local traditions, but perhaps most interesting is the opportunity it offers in studying inter-island interaction. The proximity of other islands was the key to Orkney's initial colonisation. Natural resources were not evenly distributed amongst the island group, but islands too small to support self-sustaining communities were inhabited because they had access to these resources on other islands. This principle, sometimes described as the "commuter effect" (Keegan & Diamond, 1987, 49) underlies the model of inter-island trade postulated in chapters 4 and 5.

1.1.1 Sources of evidence: archaeological, historical, ethnograpic, toponymic, geographical

The starting point for this study is the archaeological evidence (chapter 2; figure 2) which consists of a range of site types: settlements, maritime structures, ships and boats, defensive and industrial sites, *thing* assembly places and *bordland* territories, chapels, cemeteries and burials, hoards, isolated finds and runes. The first three of these are of most relevance to this study.

Many of the settlements excavated in Orkney are high-status sites mentioned in the *Orkneyinga Saga*, the Saga of the Earls of Orkney written in Iceland in the thirteenth century. Examples include the Late Norse hall and associated buildings at Tuquoy, Westray and the earldom residence on the Brough of Birsay, Mainland. Small farmsteads have been found at Buckquoy and Saevar Howe, Birsay, though in neither case is the full extent of the site known. Much of the former had already been lost to the sea when it was discovered and the latter had been disturbed in 19th century excavations. Re-evaluation of the site conducted by John Hedges covered only a limited area of the site. Coastal erosion has revealed the location of many such sites, including *farm-mounds*, a phenomenon of the North Atlantic colonies which seem to have formed through centuries of construction and the accumulation of unused animal dung and blown sand. It is likely that many modern farms sit on top of older Viking and Late Norse sites as yet undiscovered.

Maritime structures, that is constructions which have a specific maritime role such as boat building sites, landing places, hards and boat shelters, are central to the idea of a maritime cultural landscape. Boat houses and the Kirkwall waterfront are the only maritime structures so far found in Orkney.

Viking nautical technology is well understood, at least so far as the great ship burials at Gokstad, Oseberg and Tune, and wrecks, particularly the five found at Skuldelev, Denmark, are concerned (Christensen, 1982; Crumlin-Pedersen, 1978; McGrail, 1987) but other than the three boats found in the Gokstad ship little is known about small boats and the potential contribution of boat studies to wider economic and environmental issues has been largely under-rated. Dendrochronological analysis showed that one of the Skuldelev wrecks was constructed from Irish oak (Bonde & Crumlin-Pedersen, 1990) and Goodburn has stressed the contribution of boat studies to understanding the *treescape* (1991). Boats and ships are both a product of the maritime environment and the means by which it was exploited, and they therefore provide information on both of these aspects, as well as describing the technological ability of the builder (chapter 6).

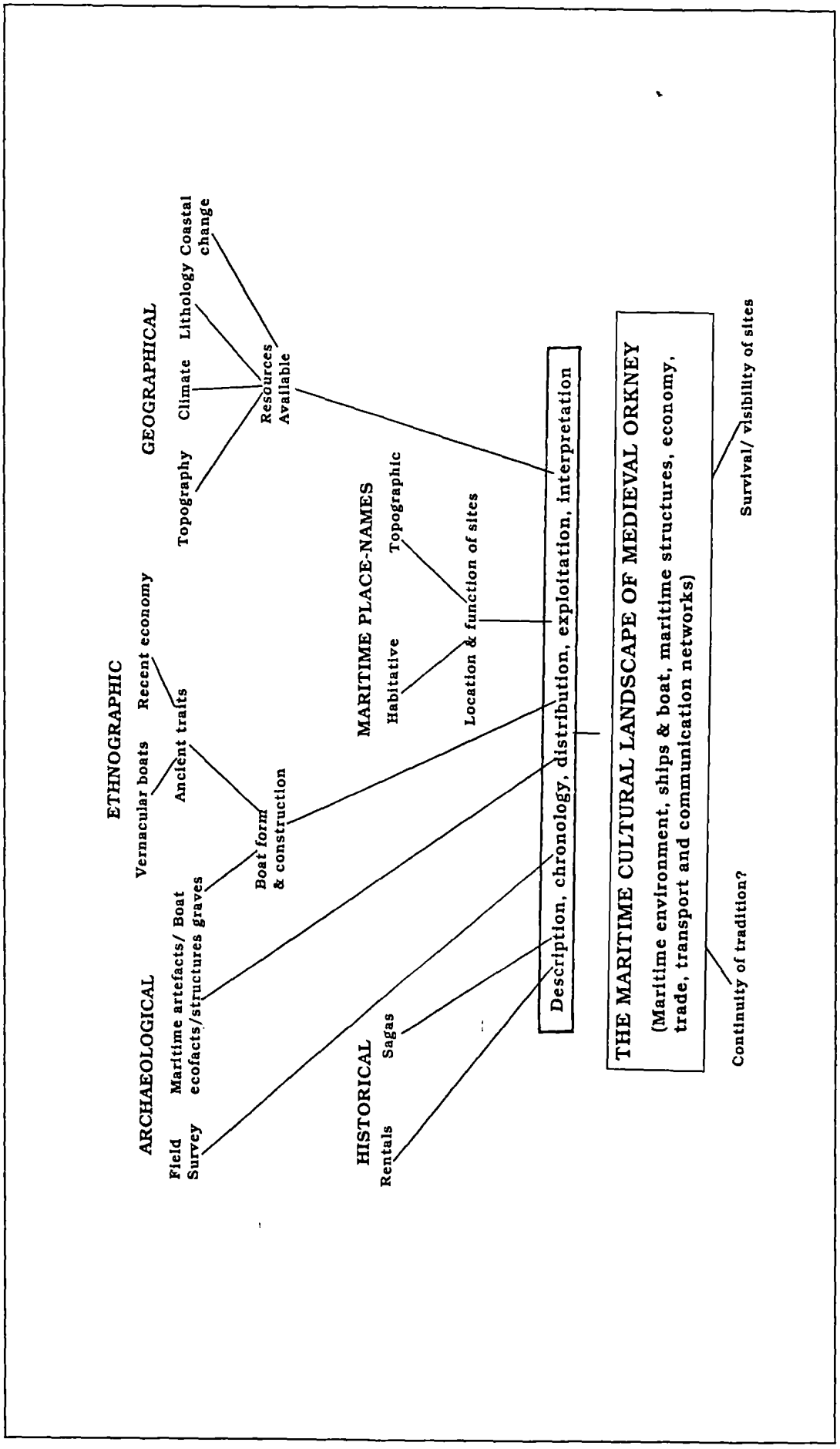


Figure 2 Sources of evidence used to reconstruct the maritime cultural landscape of Viking and Late Norse Orkney

Archaeology v history: an interdisciplinary approach

Three categories of primary historical sources survive for the period AD 800-1500 in Orkney: sagas, rentals and miscellaneous records (1.2). Together with place-name studies these formed the basis for the historical frameworks created by Barry (1805), Clouston (1932b) and even Thomson (1987).

The relevance and treatment of archaeological evidence in an historical period continues to be a subject of debate (e.g. Rahtz, 1984; Driscoll, 1984; Reece, 1984; Deagan, 1982; Trigger, 1989; Miller, 1991; Little & Shakel, 1992; Kristiansen, 1993). Archaeology in these circumstances has been described both as "text-aided" and "historical archaeology" where the archaeology merely serves to fill the gaps in the historical record or to test the validity of that record (Deagan, *op. cit.*, 49). Reece (*op. cit.*, 113) protested that fragmentary historical records should not drive archaeological research. It is a truism that the two sources are often complementary, the one informing us about major historical events and the other a means of investigating everyday life in the past. At the same time the present author believes that the historical record cannot be overlooked, and so whilst the starting point of this thesis is the archaeological material evidence, primary and secondary historical sources are also considered. The approach in this thesis is an inter-disciplinary one using also secondary ethnographic and linguistic studies, since it is the combination of all these sources, at the level of synthesis, which gives meaning to and contextualises the excavated evidence.

Historical and linguistic sources are arguably themselves forms of material evidence, although they require methods of analysis different from archaeology (Rahtz, 1984). Whilst it is appropriate to consider these material categories independently in the first instance, and as subjects in their own right, for example in excavating a site or considering specific documents, they are all ultimately products of the same past (Driscoll, 1984) and must be considered together in order to reconstruct that past. (Whether the past is considered as a finite entity or an abstract concept which is repeatedly and differently invented in the present according to our personal assumptions [Kristiansen, 1993]).

If one accepts that a multi-disciplinary approach is desirable, the question then remains how to conduct such a study. This is inevitably based on an individual scholar's background and training. The present author is an archaeologist by training and for the most part, therefore this study focuses on the archaeological material, drawing on documentary, ethnographic and linguistic studies only where these shed light on the topic under discussion, or where archaeological evidence is wanting. The collection of non-archaeological primary evidence was limited to the coastal change questionnaire survey in chapter 3. The analysis of primary documentary and linguistic evidence was considered beyond the scope of the present work, since it would have required special training.

The limitations of adopting such an approach are evident. Other people's methods of data collection and analysis may not be relevant to one's own research and the reliability of their results may be questionable. Nevertheless it is only through such a synthetic study that a more complete picture of the past can be created.

The discovery and excavation of a Viking boat, for example, reveals past technology and may contribute to our knowledge of networks of trade and communication, but cannot inform us of the naval levy system and traditions of the giving of ships as gifts, recorded in the sagas. The use of similar boatbuilding techniques in the present day in Scandinavia and the Northern Isles provides an insight into the construction and performance characteristics of the Viking tradition, and the use of ethnographic analogy is thereby justified, provided that it is employed with care. Comparisons between areas which are environmentally and culturally distinct from the society under study are not valid in a contextual approach, and the researcher must beware of assuming an evolutionary approach. Similarity in building practice five hundred years apart implies neither continuity nor a linear development in the intervening period.

Ethnography is just one discipline used to develop analogies and models to interpret archaeological data. Concepts derived from human geography, sociology and the philosophy of science are others (Charlton, 1981; Wylie, 1985; Dincowze, 1987). Ethnographic studies have played an important part in understanding the construction and use of boats (Henderson, 1978; Marshall, 1987), maritime economies and trade networks (Kaland, 1982), the range of maritime structures and their uses (Bowman, 1990) and the folklore and superstitions of maritime communities (Lethbridge, 1952). Continuity is a recurrent theme in maritime studies. Conservatism in boat building traditions through the centuries has been stressed but, as suggested above, no direct continuity can be proven (chapter 6). There have been similar claims for house construction traditions (Stoklund, 1984).

Place-names provide information on the location and function of sites which might also be supplemented by the evidence of rentals and sagas (1.2). Westerdahl (1980) used a combination of maritime place-names and a knowledge of current patterns and coastal topography to determine likely sea routes along the medieval Swedish coast, but noted that these would vary both according to the type of craft being used and through time. One class of place-names in Orkney, those with the suffix *-ness*, may reveal sailing routes around the islands, at least in post-medieval times and possibly earlier (chapter 5).

A detailed knowledge of the maritime environment, its topography, climate, lithology, the coastline and the distribution of natural resources, is a prerequisite in studying the maritime cultural landscape. Crawford (1987) recognised this, but devoted only 16 of 274 pages to a discussion of the maritime environment, ships and sea routes of Scandinavian

Scotland together with the geological background as an introductory chapter separate from the main body of the text. It is, however, the integration of such material which offers the most significant potential insight into the economy, mechanisms of trade and settlement distribution patterns. This is the approach taken here.

The medieval maritime environment must be reconstructed since the coastline, current patterns, sediment flows, sea routes, inland waterways and topography of Orkney have changed since the medieval period. Being located on the shore maritime structures provide a means of measuring coastal change (chapter 3). Myhre (1985) and Westerdahl (1987; 1989) both touched on this in their work in Sweden and Denmark respectively, though inevitably models of coastal change draw upon geographical studies.

There are two important by-products of this study. The analysis of coastal change in the islands produced information relating to the survival and visibility of archaeological sites which will be crucial to their future management. Secondly, and of interest to ethnographers, is the evidence produced of the degree of continuity between the medieval way of life, recent and current traditions.

So far as the maritime cultural landscape of Medieval Orkney is concerned the only detailed study of coastal change has been of the Kirkwall waterfront (McGavin, 1982; Gourlay & Turner, 1978). Maritime structures have been excavated at Westness, Rousay (Kaland, 1973) and the Brough of Birsay (Cruden, 1965). Both Hunter (1992) and the present author (Bowman, 1990) have looked at the problem of boat shelters but other maritime structures have received little attention. Four boat burials have been excavated but little has been published on their form and structure or their purpose (Kaland, 1973; Dalland, 1992). Clouston (1928) and Marwick (1935) considered the issue of the existence of an Orcadian naval levy system (*leidang*), akin to that recorded in Norway, on the basis of historical accounts and land divisions. Syntheses of maritime trade, transport and communications networks, however, are lacking, and whilst there is information available on individual settlement economies detailed analysis of the extent to which they might be considered maritime is wanting. These issues are addressed in chapters 4 and 5.

1.1.2 A marine subsistence economy

The economy of Orkney in the Viking and Late Norse periods may be divided into two categories: the *subsistence economy* which concerned food production and procurement activities (hunting, gathering, fishing, agriculture and animal husbandry), and *economics* in the sense of the operation of trade and exchange mechanisms. Central to the concept of a maritime cultural landscape is the operation of a subsistence economy based at least in part upon the exploitation of marine and littoral resources. The evidence for a such a marine resource-based subsistence economy in Orkney comes from four sources: direct evidence in

the remains of *seaware* (fishbones, shellfish, seaweed, driftwood) and *maritime artefacts* (net and line weights and fishing hooks) on archaeological sites; indirect evidence based on the resources which were available and recent analogies to their exploitation.

Fishbone assemblages from two sites in Orkney, the farmstead at Buckquoy (Wheeler, 1977) and the settlement on the Brough of Birsay (Seller, 1986) arguably reveal a pattern of increased exploitation of marine resources in the Viking period over the previous Pictish economy, though the evidence is inconclusive. Just five species of fish were represented in Pictish levels at Buckquoy. The abundance and range of fish types more than doubled in Norse levels. No fishbones survived from the Pictish occupation on the Brough of Birsay, although they were recovered from contexts dating between the second half of the ninth and the early eleventh centuries AD.

It is possible that collection strategies and other taphonomic factors account for this perceived pattern. A considerable part of both sites has been eroded away and this may have included middens associated with occupation at the sites. Little is known about original fishing, processing and disposal patterns though these are inevitably reflected in assemblages. Furthermore sieving to collect small bones was not employed at either site. The impact of these factors on interpreting assemblages and the likelihood of increased exploitation of marine resources in the Late Norse period are discussed further in chapter 4.

Bigelow (1992) suggested that the twelfth century in Shetland marked the transition from largely subsistence-based to exchange-oriented economies, based partly on the export of fish, possibly in return for grain. Just four excavated sites provide the evidence for his model: Jarlshof, Underhoull, Sandwick and Da Biggins. Occupation spans the whole Viking and Late Norse periods only at Jarlshof. Excavation there in the first half of this century predated the development of environmental sampling strategies. Fishbones and shellfish were not collected and the hypothesis of the intensification in fishing in the Late Norse period is therefore based solely upon an increased number of fishing line-sinkers occurring in Late Norse contexts (Hamilton, 1956).

The discovery of what appears to have been a fishing-base and processing site at Freswick, Caithness during the eleventh to thirteenth centuries AD (Batey, 1987a), and the large number of fishbones (144,000) found at the Late Norse settlement site at Tuquoy, Westray (Owen, pers. comm.; Ritchie, 1993) may support Bigelow's theory of increased fishing from the twelfth century, not only in Shetland, but throughout the Orkney Earldom. Contrasting evidence, however, was found at Pool, Sanday (Hunter & Bond, pers. comm.) where the twelfth-century subsistence base was firmly agricultural and pastoral.

Interpreting environmental assemblages

The interpretation of marine assemblages is not straightforward. Colley (1989) and Jones (1992a) among others have stressed the biases of original fishing and butchery practices, archaeological recovery procedures and preservation factors on the representativity of fish assemblages. These are discussed in detail in chapter 4. This is no less the case with whale, seal, seabird and shellfish remains. Quantitative analyses and adequate interpretation are also hampered by the limited and partial nature of excavations, often at sites which have already been significantly eroded. Dry and wet sieving to recover the smaller fish bones was only introduced in the 1980s by Morris and Hunter in excavations in Birsay Bay.

It is the contention of this thesis that marine resources (especially fishbones and shellfish) are often grossly under-represented in the archaeological record in comparison to animal bones (cattle, sheep/goats and pigs). Excavations at the post-medieval settlement at Hope Colony, Greenland demonstrated the case clearly (chapter 4). The clerics there kept records of their daily diet and success at catching birds and fish to supplement the dried meat and fish shipped in annually from Norway. The environmental assemblage from the excavations accounted for almost all the domestic animals, but virtually none of the fish. The reason for this is not surprising. Rotting fish smells. Waste was probably taken as far away from the settlement as possible or was thrown into the sea to be taken out on the next tide. The effect of such disposal patterns on our interpretation of faunal assemblages from sites in Viking and Late Norse Orkney is considered in more detail in chapter 4.

Indirect evidence for the exploitation of marine and littoral resources

Fishing tackle rarely survives in the archaeological record. The full range of Medieval fishing tackle found in Norway, Poland and Russia comprised net floats, nets, lines, hooks, net weights and line sinkers, netting needles, mesh pins and line winding handles (Steane & Foreman, 1991). Net weights or line sinkers have been recovered from only ten sites in Orkney. The distinction between the two is not clear but is central to the question of which fishing techniques were employed. It is likely that nets were used since there are few hook finds, but neither nets nor net floats survive in the archaeological record. In chapter 4 the artefact assemblages from excavated sites are reassessed with a view to identifying more maritime artefacts.

The inhabitants of medieval Orkney also hunted whales and seals. Whalebone artefacts occur on several sites, but unworked bone is less frequent, perhaps because the carcasses of stranded or hunted victims were butchered on the beach, and relatively little bone reached the settlement sites (Donaldson *et al*, 1981). Prescott suggested (pers. comm.) that the slipway at the Brough of Birsay (gaz. no. 002) may actually have been built

for whale butchery. If this is so we might expect to find similar structures elsewhere in the islands.

Seaweed was collected for a variety of purposes. It occurred in medieval contexts on the Brough of Birsay. The species there did not rank among those which are edible, although they may have served as animal fodder, for manuring or even for caulking boats (Donaldson *et al*, 1981, 79; Bell, M, 1981, 118). At Pool, Sanday seaweed was burnt as fuel (Hunter, 1986b, 219).

People collected driftwood from the shore. Species of timber recovered from the Brough of Birsay and sites in Birsay Bay included birch, pine, oak, hazel, willow and aspen, and whilst some of these may have been indigenous or even imported, some probably arrived as driftwood (Hunter, 1986b, 220; Morris *et al*, 1989, 262).

Early modern statistical accounts provide information on the exploitation of marine resources which might be used retrospectively (see 1.1.1). Whilst the kelp industry is a recent introduction, the collection of birds' eggs and seabirds from cliffs on Copinsay (Low, 1978, 47) and the export of feathers may have been an ancient practice. Seabird bones are found in site assemblages and some show signs of butchery.

Shell-sand and fish middens may have been used to manure the land. This would have enhanced the phosphate levels and so should be detectable through phosphate analysis, a technique which has been applied rarely to sites in Orkney. Both shell-sand and midden material are elements of farm mounds characteristic of the Norse colonies (see 2.1.2). There the sand is wind-blown and although the accumulated mound material was suitable for manuring, it was not used for this purpose, the soils apparently being sufficiently fertile already. At Freswick, Caithness (Batey, 1989, 226) the middens themselves had been cultivated, both in antiquity and in the modern day.

Natural resources, including seabirds, seals and even fish, were never evenly distributed around the island group and so inter-island exchange networks were integral to the operation of Orkney's subsistence economy.

1.1.3 Maritime trade and communication routes

The use of the term *landscape* when describing Orkney's maritime cultural heritage is somewhat misleading since it conjures up in the reader's mind a picture of maritime structures, artefacts and ecofacts found only on land. In reality the concept also encompasses a *seascape* of maritime sea routes and associated archaeological sites (wrecks, jettison sites and anchorages).

The sea played an important role during the Viking and Late Norse periods in trade and communication both between neighbouring islands in the group and with Scandinavia and the other North Atlantic colonies: Shetland, Fair Isle and Caithness, the Western Isles

and Man, Scotland, England and Wales, the Faroes and Iceland. Basic commodities such as peat, wood and iron were unevenly distributed among the islands, and by tracing their distribution on archaeological sites it is possible to reconstruct trade routes between the islands (chapter 5). For example, the ballast site at Peatworth, Stronsay (gaz. no. 112; see 2.1.1) lies adjacent to the only peat bed on the island and it is tempting to explain its origin as an accumulation of ballast from boats which came ashore to take away a load of peat. The hogback tombstones found at chapel sites scattered through the island group (see 2.1.3) were all made from Hoy red sandstone (Lang, 1974, 227-8 & 230-2). Similarly red sandstone, this time possibly from Mainland Orkney was shipped to Kirkwall for the construction of St. Magnus' Cathedral. The limited sources of iron, from ore on Hoy or from bog iron, and the pockets of woodland on Hoy, the Deerness peninsula, Mainland and Rousay, would have been much in demand, though pollen cores suggest that woodland was more extensive in the islands then than there is now (Davidson & Jones, 1985, 33-4; Ritchie, 1995, 19). Hoards and individual coins found in Orkney (5.2.2) have been provenanced to most areas of Scandinavian contact, and whilst these are not evidence of direct contact, they serve to remind us of the "global" scale of communication of which Orkney was a part. Literary references are more specific, for example in describing the export of flour from Orkney to Iceland in the thirteenth century (Thorsteinsson, 1964, 156).

The network of inter-island and international trade and transport routes is evidenced in the distribution of settlements and maritime structures, the types of boat used, and an understanding of the coastline and underwater topography, currents and local wind patterns.

Viking boats

Four small ninth-century boats which were probably involved in this inter-island trade have been found in Orkney (gaz. nos. 24, 28 and 45; chapter 6). They were each built in the *Nordic* tradition using narrow, overlapping planks, and they ranged in length from 4.5 to 7m. They were designed for use in sheltered inshore waters, although the largest may have been used offshore. The boats were double-ended, suitable for both rowing and sailing. In addition to these a *logboat* has been found near Lea Shun, a loch on Stronsay (gaz. no. 177; chapter 6). Its discovery near a loch is not surprising. *Logboats* were used on rivers and lakes throughout the British Isles from the Bronze Age until post-medieval times. The boat is as yet undated, but may prove to be medieval. These small boats would have used informal landing places: sandy shores and inlets. The rounded bottoms and high sweeping stems of the *Nordic* craft were designed for beaching. The construction of a formal jetty at Kirkwall in the twelfth century indicates, however, that larger craft were involved in transporting materials for the construction of St. Magnus' Cathedral.

There seem to have been few medieval ports from which long distance trade operated. Kirkwall is an obvious major port, but Pierowall on Westray, identified as the *Höfn* of the *Orkneyinga Saga* (Palsson & Edwards, 1978, 250) was probably another. Imported medieval pottery was found at Tuquoy on Westray and Pool on Sanday which suggests that these sites may have acted as beach markets (they had no formal landing facilities).

As well as the landing and marketing of goods, archaeology may well provide evidence of their onward transport and distribution inland. Loch Harray and Loch Stenness in western Mainland must have been pivotal in transporting goods to the interior and there was doubtless a *portage* site, and possibly a *centre of maritime culture* (Westerdahl, 1994) where sea and loch met at the Bridge of Waithe. Westerdahl (1980, 321) noted that market places and other places of special jurisdiction in medieval Sweden were given a religious title such as *Helgö*, "hallowed island". This might explain the Eynhallow (ON *eyin helga* meaning hallowed island) in Orkney. Interpreted as a monastic site it may also have served as a port of trade on an important sea route between Rousay and Mainland.

The network of medieval sea routes is very different from that found on a modern Admiralty chart or even an eighteenth century chart, though the influence of winds and currents was just as important, if not more so. Rowing boats maintained a coast hugging route in shallow water and made use of portages and a range of natural landing places including narrow inlets, whereas deeper draught vessels required greater depth and formal landing facilities or a shallow shelving beach (Westerdahl, 1989).

Long distance sea routes are quite well documented, but no-one has previously attempted to reconstruct the inter-island trade routes of Orkney. The recognised sailing route from Norway to Greenland is preserved in the *Landnamabok* and the route from Norway to the Kingdom of Man via Shetland, Fair Isle, Orkney and the Western Isles is well attested (Crawford, 1987, 13), although *Egil's Saga* also describes a route down the east coast of Scotland and England (Binns, 1968, 111).

Navigation for long distance voyages relied for the most part upon a knowledge of latitude and the movement of the sun and stars, tides and currents. Pilotage by recognised landmarks and by taking depth soundings together with a basic knowledge of currents, eddies and local wind patterns was crucial to inter-island travel even where islands were inter visible.

1.2 Previous approaches to the study of Viking and Late Norse Orkney

The analytical and synthetic maritime approach presented in this thesis is a new departure for Medieval studies in Orkney. Previous approaches might be classified as

belonging variously to schools of historical research, place-name and language studies, or site-specific archaeological and inter-disciplinary studies. In the early years of this century historical sources formed the basis of research into Medieval Orkney. Such was the dearth of archaeological investigations that the Corpus of Viking Antiquities for Orkney and Shetland produced in 1940 occupied only part of one slim volume (Grieg, 1940). Since then there has been a rapid expansion in archaeological research in the islands, including several large-scale excavations, mostly rescue-led. Final reports for some of these sites are not yet published, and as a result of this there is a shortage of synthetic works.

The translation and publication in the nineteenth century of several Icelandic Sagas triggered an interest in the Viking World which has never been lost. The *Orkneyinga Saga*, the History of the Earls of Orkney, remains the most influential of the sagas in Orcadian studies since it names both places and leading people, bringing to life eleventh and twelfth century Orkney. A pre-occupation with the sagas and other historical sources restricted early archaeological research to addressing questions of the location and appearance of named farmsteads and drinking halls, to questions of the chronology of Scandinavian settlement which were largely based on place-name studies, and to the relationship between the Native and Norse peoples. Relatively little time was devoted to later centuries which were not covered by the sagas or to questions of the economy and environment of the island group.

Research over the last twenty years has gone a long way to redress the balance. The application of scientific prospection and dating techniques came late to studies of medieval Orkney where the discovery of sites relied upon coastal erosion and dating was by artefact and structural typologies or by historical association. Now excavation is often supplemented by geophysical survey, and radiocarbon determinations and environmental analyses are the norm rather than the exception.

It is surprising given the amount of recent work and the co-operation between researchers in Scandinavia and the erstwhile North Atlantic Norse colonies that research in the various countries has not developed along similar lines. The discovery in Norway of great Viking ship-burials such as Oseberg, Tune and Gokstad early this century marked the beginning of *maritime archaeology*, by which I refer to the study of all aspects of seafaring, boats, ships and related structures on shore. Similar, although less spectacular discoveries have been made in Orkney, but have received little attention and the theories and methodologies of maritime archaeology, although considered, have not been exploited.

1.2.1 Historical studies

The first published history of Orkney was by Barry in 1805. A detailed account of the Viking and Late Norse periods did not appear, however, until 1909 (Gunn, 1909). This

was heavily influenced by the recent translation into English of several Icelandic Sagas, notably the *Orkneyinga Saga* in 1873, but also by the publication of fifteenth and sixteenth century rentals of Orkney (Peterkin, 1820). Thomson (1987) gives a good summary of the historical framework which was thereby constructed. In 1914 Clouston published other surviving documents from the period 1299-1614, including correspondence between Scotland, Orkney and Norway, conveyances and dispositions, and the marriage contract between King James III of Scotland and Princess Margaret of Denmark in which the Western Isles and the Isle of Man were given to James and Orkney was pledged in lieu of 50,000 florins. This contract is generally taken to mark the end of the Late Norse period in the islands.

Clouston and Marwick, two influential figures in the Orkney Antiquarian Society who were active between the two World Wars, published a series of papers in the Society's proceedings and in *Scottish Historical Review*. Clouston concentrated on questions of land division, tax and administration (1918; 1928), specific site studies: *bus* and castles (1926; 1927; section 2.1.2) and also wrote a History of Orkney (1932). Marwick expanded on some of Clouston's ideas on Norse naval defence systems (1935; 1949) and also considered Norse castles (1928), but is most often remembered for his contribution to Scandinavian place-name studies (1923, 1925, 1927a, 1931, 1947, 1952 and section 1.1.2).

Clouston (1918) used the assessment of the *urisland* (a land unit measure) values of property found in the rentals to define administrative territories and Earldom divisions and even to trace the settlement of the islands with initial settlement being in areas where the *urisland* value had decreased below the norm by the year 1500, presumably because these areas were already densely occupied. There is little evidence to support such far-ranging conclusions. Steinnes (1959) based his division of *huseby* or royal administrative farms and their territories upon a similar analysis and also looked at the productivity of each area.

In 1962 F.T. Wainwright wrote an account of the Viking period which drew, for the first time, as much upon archaeological and linguistic sources as historical sources. Subsequent studies, at least in part interdisciplinary, are outlined below (1.4).

The limitations of early historical studies

For a period which is now recognised as an "historical minefield" (Hunter, 1986b, 69) early treatment of saga material as historical fact is now considered too simplistic. The historical sagas, of which the *Orkneyinga Saga* (Taylor, 1938 & Pálsson & Edwards, 1978), the *Heimskringla*, a collection of stories of the Kings of Norway (Morris & Magnússon, 1905) and *The Saga of King Olaf Tryggvason* (Sephton, 1895) are the three which are pertinent to Orkney, were written partly for political ends to legitimise the Norwegian dynasty and partly as literature in their own right, drawn from earlier oral traditions, poetry

and other texts. Far from complete in their coverage being concerned only with a small segment of society, they describe both mythical and apparently historical events which took place hundreds of years earlier.

Apart from the *Orkneyinga Saga*, Orkney is usually only referred to in passing in sagas, as a place to which one of the characters went or because one of the Orkney Earls was partaking in an adventure elsewhere. There are two exceptions to this: the story of the establishment of the Earldom and the conversion of Earl Sigurd to Christianity by King Olaf Tryggvason of Norway. Accounts of both incidents occur in the *Heimskringla* and the *Saga of King Olaf Tryggvason* as well as the *Orkneyinga Saga*. All three sources concur that King Harold Finehair of Norway established sovereignty over Orkney and conquered vikings who were already encamped there. This agreement is hardly surprising considering that the *Orkneyinga Saga* was a source used by Snorri Sturlason, the author of the *Heimskringla* which in turn contained the short *Saga of Olaf Tryggvason*, itself the basis for the longer saga. The twelfth century *Historia Norvegiae* offers a different interpretation; that vikings, related to the first Earl Rognvald, subjected Orkney, in Harold's lifetime. Other versions occur in *Grettis Saga*, *Egil's Saga*, *Eyrbyggja Saga* and the *Laxdoela Saga*.

Taylor's study of the compilation of the *Orkneyinga Saga* (1938) demonstrated why saga material should be treated with caution. Originally written in the thirteenth century in Iceland, the *Orkneyinga Saga* is a compilation of shorter sagas. Taylor calculated that the earliest surviving manuscripts of the Saga, only three leaves, were third generation. The most extensive version of the Saga occurs in the Flateyjarbók, a fourteenth century document, itself probably sixth generation, and which is, not surprisingly, often inaccurate, especially in renderings of place and personal names. Furthermore, Taylor showed that seven sections of the Saga as we have it today are later interpolations.

The Saga provides, nevertheless, a basic genealogy of the Earls of Orkney and conveys a flavour of the period, its political tensions and the frequent warfare, feuding and division of the Earldom.

In using both the rentals and miscellaneous records the researcher faces similar questions of the authenticity of the documents, the recognition of later revisions and interpolations, and knowledge of the initial accuracy and purpose of the records. The earliest surviving rental of Orkney was written between 1497 and 1503 at the request of Henry, Lord Sinclair, and therefore provides information about the very end of the period of research in this thesis. The rental records names of holdings and the amount of tax (*scat*) due to the Sovereign, the Earl (*maills*) and the Church (*teinds*) and the means by which these were to be paid such as butter or meal. Places which formerly belonged to the Earl's *Bordland* or estates are listed as these were exempted from certain taxes. The rental thereby

indicates long-established holdings. The parish system was already established when the first rental was written, but the rental is not complete.

The second rental, sometimes called Bishop Law's Rental, was written in 1595. The means of payment of dues was somewhat altered by this time, as was land ownership so the use of this rental to extrapolate back to earlier times is more problematic. Of course, the rentals only list what taxes were due and not what was actually paid and though they give a detailed insight into the very end of the Medieval period their relevance to the first few centuries is questionable.

The contribution of historical studies to the study of the maritime cultural landscape

The usefulness of the *Orkneyinga Saga* and other sagas to the present work lies in their references to the location of farmsteads and sea-routes and the glimpses they provides into social and economic structures. They contain snippets of information on the use of war beacons, naval levies and the range, manufacture and use of boats and ships. Such information, often incidental to the plot of the particular saga, is likely to be accurate and is considered in detail in chapter 6.

The possible significance of the rentals to this study is their list of fifteenth century holdings, many of which can be traced to modern farm names, thereby giving an impression of the density and coastal distribution of settlement at that time (section 2.1.2). The rentals also contain some of the earliest renderings of Norse *maritime place-names* (see 1.2.2).

The miscellaneous records from petty grievances, through contractual agreements and letters give an insight into the relations between Scotland, Orkney and Norway before the impignoration of the Isles and go some way to bridging the gap between the age of the sagas (the ninth to thirteenth centuries) and the more detailed historical record of the sixteenth and seventeenth centuries (Clouston, 1918). None is of particular relevance to the present study.

In addition to the three primary historical sources outlined above (sagas, rentals and miscellaneous records) I also consider the three early modern statistical accounts of the islands (1791-1799, 1845 and 1950) (OSA, 1978; NSA, 1845; and Miller [ed.], 1985 respectively). These provide an indication of the extent of land improvements, reclamation and changes in agriculture carried out in the early modern period, together with an insight into an earlier island culture.

1.2.2 Language studies

Language studies relevant to this thesis divide into two categories: place-names and the Orcadian dialect. Both are sources for the maritime cultural landscape.

Place-names

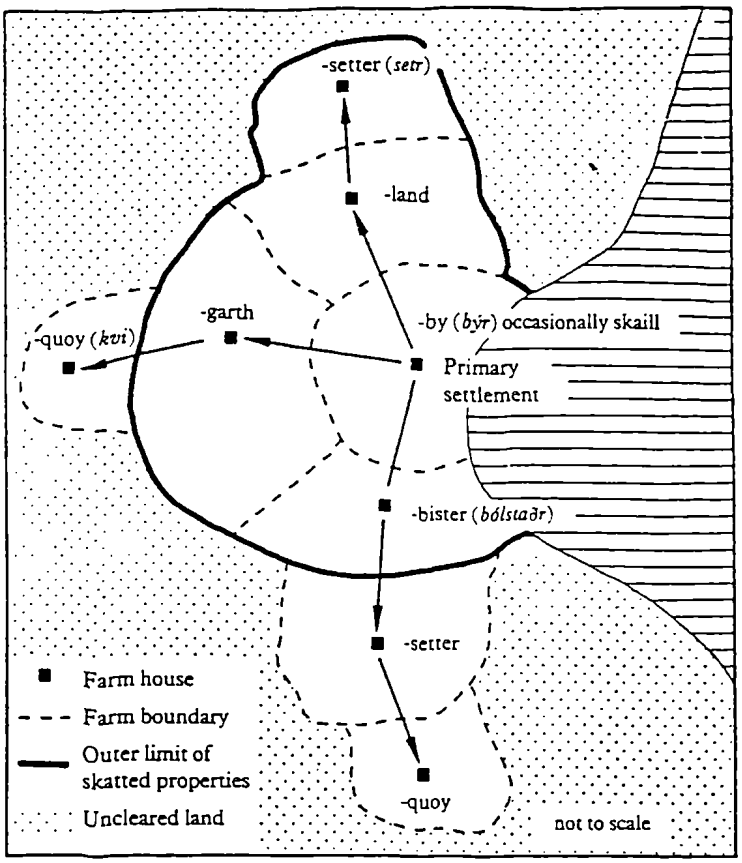
The Scandinavian place-names of Orkney have been studied in some detail by Marwick (1923; 1925; 1927a; 1931; 1947; 1952; 1970) and Nicolaisen (1969; 1976) who drew on Marwick's work. Not surprisingly, early work was devoted to identifying and interpreting place-names found in the *Orkneyinga Saga* (Taylor, 1931). Marwick, influenced by the work of P.A. Munch, Jakob Jakobsen. Oluf Rygh and A.W. Brögger, devised a chronology of place-names and used this to establish the date and expansion of Viking settlement as well as the origin of the settlers. Although now considered as a hierarchy or relative chronology rather than an absolute chronology (Thomson, 1987, 27; Morris, 1985, 230), Marwick's scheme still stands (figure 3). He considered the names Skaill (ON *skáli*) and Bu (ON *býr*) to represent primary settlement, -land (ON *land*), -garth (ON *garðr*) and -bister (*bólstaðr*) to be secondary and -setter (*setr*) and -quoy (ON *kvi*) names to have been established last.

Thomson (1987, 27) highlighted the main problem of Marwick's approach; he assumed that all names had been assigned by the tenth century when in fact the same names are still being given to farms today. Moreover the evolutionary model precluded different names being established simultaneously. For example, setter names (ON *setr*, a shieling) might logically belong to another farm. In his most recent work Thomson (*op. cit.*) argues that -setter and -quoy names record a change in emphasis from pastoral to animal use and that -garth, -akr and Skaill names represented new names on what was then old land. Thomson's work is an important step towards questioning the significance of the etymology of the names, as well as determining their date, distribution and frequency.

Arguing a chronology from place-name evidence alone is always problematic since most of the names were not written down until the sixteenth century, excepting the few saga names of thirteenth century date. Without supporting evidence it is impossible to prove when two farms called Skaill were established or if they were contemporaneous.

Maritime place-names

For the purposes of this study the chief significance of place-names lies in their meaning. They describe activities such as farming and fishing practices and topographical features such as the distribution of resources. Maritime place-names (Westerdahl, 1980, 315) can indicate the positions of landing places, ballast sites, sea routes, fisheries and portage sites.



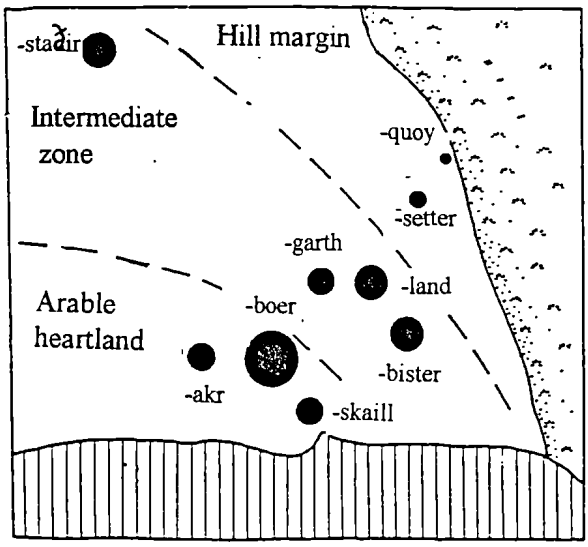


Figure 3 Place-name chronology
a) after Bailey (1971,76); b) after Thomson (1987, figure 2)

In Orkney these include such names as: Vesker (ON *veiði sker*, a fishing rock), Tails of Stow (ON *stǫd*, a common name for a boat naust or landing place), Cobbie Roo's Lade (ON *hlað*, Kolbein Hruga's load or pile [of ballast]), Skippie Geo (ON *skípa gja*, ships' geo), Skennist (ON *Skeiðarnaust*, naust for a longship) and Eday (ON *Eið ey*, isthmus isle).

Holmberg (1991) outlined the problems inherent in the exploitation of place-names as a source of information for maritime studies such as the occurrence in the same form of two names with quite different meanings, or a single word which has more than one meaning. Originally intended as aids to localisation, place-names do not always reflect the function of a place and in many instances the existence of a former harbour or other structure will not be evident in the name (see chapter 5).

It is with these reservations that I have based my investigation of maritime place-names in Orkney only on published etymologies. Unfortunately most of the maritime place-names in Orkney occur neither in the rentals nor the sagas and it is impossible to date them earlier than the mid seventeenth century when the first reliable charts were produced by Dudley in 1646 and Collins in 1693 (Robinson, 1962). Most names were written down for the first time on the first series Ordnance survey maps of 1880s and the accuracy of and means by which this information was acquired has been questioned (Lamb & Turner, 1991, 171). Nevertheless the names do provide an insight into the Medieval land- and seascape. For example place-names with the suffix *-ness* may mark sea routes through the islands (chapter 5).

Old Norn

Norn, a version of Old Norse, was spoken in Orkney into the eighteenth century and in Shetland as late as the nineteenth century (Wainwright, 1962, 121) though how and when it finally died out is a matter of contention (Barnes, 1993, 67). Today, the Orkney dialect still contains many words of Scandinavian origin (Lamb, G, 1988). Marwick (1929) published a book on Orkney Norn modelled on Jakobsen's dictionary of Shetland Norn (1928; 1932). These studies provide a wealth of detailed information which has rarely been consulted by subsequent researchers.

Osler (1983) listed words derived from Norn which are still in use today in Shetland to describe the parts of a boat. The same could be done for parts of an Orkney *yole* (see 5.2). Other Norse maritime terminology persists in Orkney and Shetland. Orcadian examples include *baa* (ON *boði*, a submerged rock), *backber* (ON *bakborði*, portside), *skyo* (ON *skýa*, a fish-drying shed), *tome* (ON *taumr*, fishing line) and *tulfar* (ON *þilfar*, a floorboard). The fact that there are Old Norse terms for such specific things implies the regular use of such terms long before the herring fishing of the nineteenth century when fishing became a specialised industry and when Norn had already died out. The question,

however, remains whether this continuity in terminology equates to a continuity in practice. Some of these words may have been introduced from Norway in recent centuries. Norse maritime terminology, with particular reference to boat construction, is discussed in chapter 6.

1.3 Antiquarian fieldwork and modern archaeological research in Orkney

Antiquarian fieldwork

Long before the Orkney Antiquarian Society was established in 1922 there was a keen interest in the archaeology of the islands. Scanning the pages of the *Proceedings of the Society of Antiquaries of Scotland* for the mid to late nineteenth century several names occur repeatedly: George Petrie, James Farrer, William Traill, David Balfour, W. Fotheringham and Robert Hebden. Of these Petrie and Farrer are the best known since much of their work has been re-evaluated more recently (Hedges, 1983 & 1987). Their fascination was with "Pict's houses" or brochs, and tumuli, usually prehistoric like Maes Howe. The discovery of material pertaining to the Viking and Late Norse periods was often incidental, although sometimes monuments were wrongly assigned a Viking origin, for example the stone circle at Stenness (Ash, 1981, 108).

Farrer, one-time MP for Durham, discovered the runic inscriptions in Maes Howe (gaz. no. 101), but failed to recognise the graves at Saevar Howe, Birsay (gaz. no. 58) as being Christian Norse and the structures as Viking and Pictish rather than "broch-period" (Hedges, 1983). Likewise in 1873 Petrie excavated a broch at Oxtro, Birsay which had cist burials above it. The cemetery is usually taken as being Pictish, but Viking hack-silver and a ring-headed pin were found, (Hedges & Bell, 1987, 57; gaz. no. 74) thereby calling into question this interpretation. Analogous cist burials have been found at Gurness, excavated between 1930 and 1939 by Craw and Richardson and re-interpreted by Hedges (1987, part II; gaz. nos. 46), and at Warebeth cemetery, Stromness, originally excavated by Laing and Petrie in 1866 and re-assessed by Bell and Dickson (1989, 105; gaz. no. 80).

On several occasions landowners conducted excavations, reported their findings to the local antiquaries who then published them. Hence Mr. Leask of Boardhouse commenced excavations at Saevar Howe (gaz. no. 58 & 59) and Mr. Rendall the excavations at the Links of Trenabie in Westray (gaz. no. 22) which were subsequently reported by Wallace (1883) and the Reverend Low (1978) and followed by further excavations by Balfour in the nineteenth century at Pierowall Links (gaz. no. 24). Thorsteinsson's review of the cemetery at Pierowall (1968) demonstrated just how confused various reports of the discoveries became. Some authors (Anderson, 1879; Grieg, 1940, 90-102) suggested the existence of up to six boat graves but Thorsteinsson found proof of only

one. These early excavations were poorly if at all documented. They often exist only as a collection of finds and sometimes even these have been lost.

Henry Dryden visited several of these excavations as he travelled around Orkney during the nineteenth century drawing ruined chapels. The archive of his work, now housed in the National Monuments Record in Edinburgh, is of great value to modern researchers. It provided the basis for a survey of Scottish ecclesiastical architecture by MacGibbon and Ross thirty years later (MacGibbon & Ross; 1897). Dryden drew many of the sites in the gazetteer (Dryden; 1870; St. Tredwell's Chapel, Papa Westray [gaz. no. 019] and figures 4 and 5, Eynhallow [gaz. no. 34], The Brough of Deerness [gaz. no. 40], and St. Mary's chapel, Wyre [gaz. no. 44] to name a few).

The Ordnance Survey's first large scale mapping of Orkney in the 1870s included gathering information on local antiquities and, although the accuracy and coverage varied according to individual surveyor's competence and interest, the maps, nevertheless, form an important database (Lamb & Turner; 1991). This was followed in 1906 by the publication of the first inventory of Norse sites in Orkney (Dietrichson & Meyer; 1906).

No medieval settlements were excavated until early this century and these were initially restricted to sites named in the sagas and associated with historical figures such as Orphir which became known as the Earls' Bu (Johnston, 1902; gaz. no. 54).

Of the protagonists of the Orkney Antiquarian Society only Storer-Clouston did much excavation; at the Wirk, Rousay (gaz. no. 032), Gernaness Castle, Stenness (gaz. no. 100) and Marwick Chapel, Birsay (gaz. no. 161).

The Royal Commission produced an inventory of archaeological sites in Orkney (RCAHMS, 1946) based on the fieldwork of John Corrie and Charles Calder during the 1930s. Both the inventory and the original field notes remain important sources of information on medieval sites, many of which have received little or no subsequent attention.

One might end discussion of the period of antiquarian interest with the excavations financed by HM Office of Works in the 1920s and 30s at Cobbie Row's Castle, Wyre (gaz. no. 35), the Broch of Gurness (gaz. nos. 46 & 47), the Brough of Birsay (gaz. nos. 51, 52 & 53) and Eynhallow (Mooney, 1926; gaz. no. 34). Records of these excavations are closer to modern standards comprising a minimum of a phased site plan, often idealised, and sometimes finds lists, though no detailed stratigraphical records.

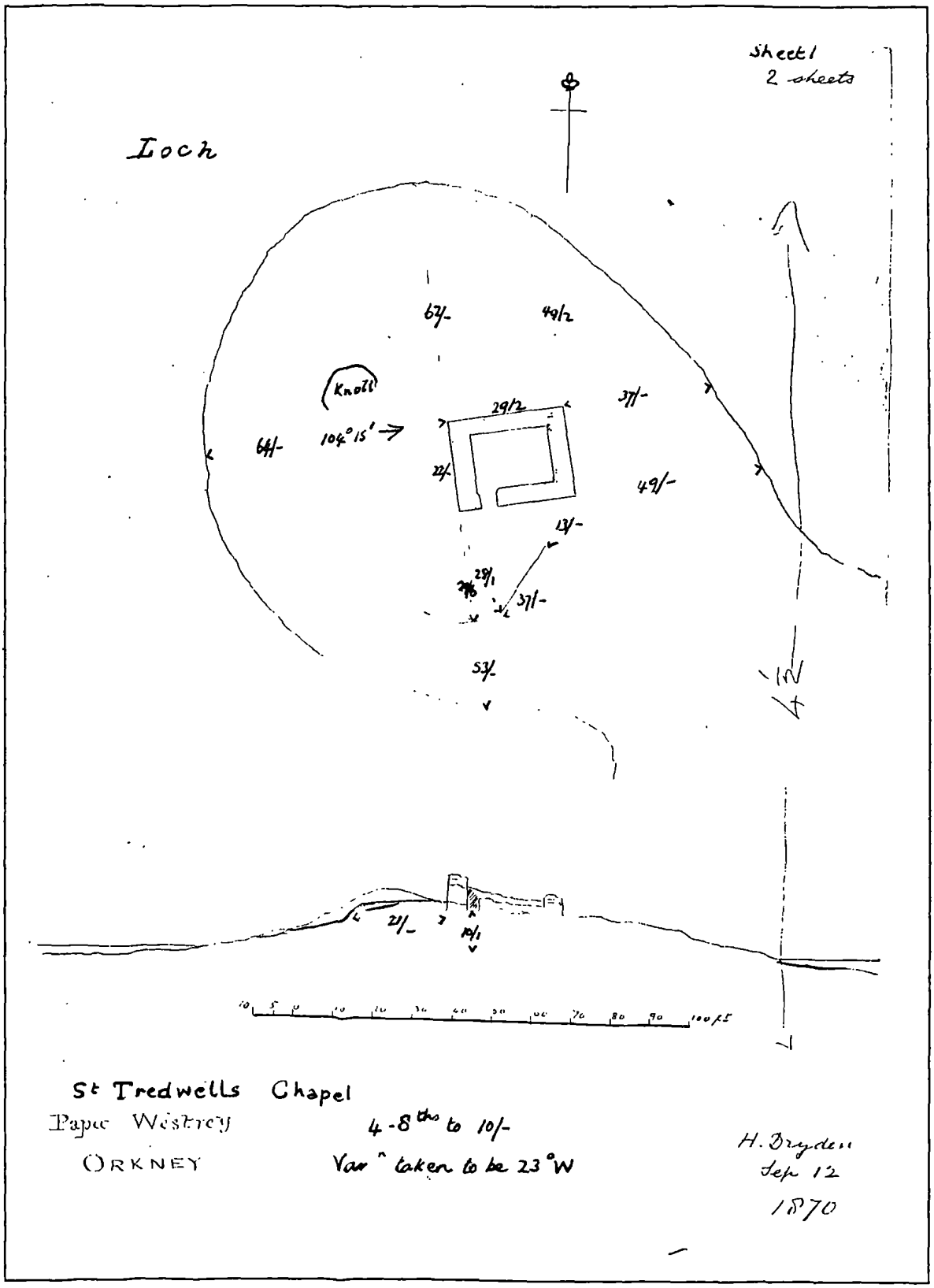


Figure 4 Drawing by Henry Dryden (Ref. ORD/105/3) Crown copyright. Royal Commission on the Ancient and Historical Monuments of Scotland (Society of Antiquaries of Scotland Collection)

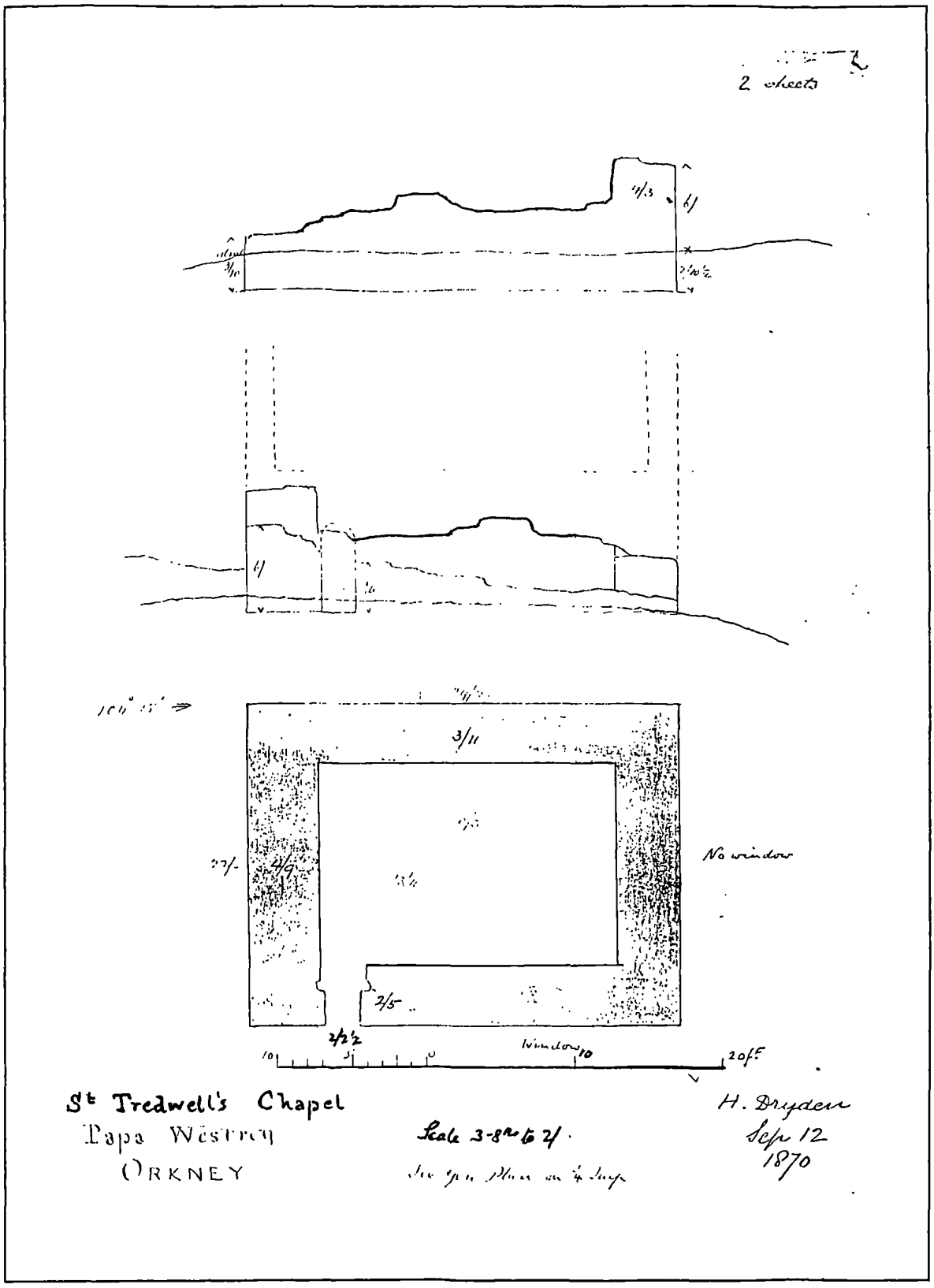


Figure 5 Drawing by Henry Dryden (Ref. ORD/105/4) Crown copyright. Royal Commission on the Ancient and Historical Monuments of Scotland (Society of Antiquaries of Scotland Collection)

In the same way as Morris (1985, 215) questioned the value of archaeological investigations between 1960 and 1980 for being rescue rather than research led, we may doubt the value of the antiquarian investigations of the eighteenth and nineteenth centuries for their lack of scientific method. Certainly they did not meet modern excavation standards but they have stimulated debate regarding the continuity of the use of brochs and they provide information on the distribution and content of Viking graves and hoards without which the map of Viking Orkney would be even less complete.

Recent archaeological fieldwork

Following excavations by the Ministry of Works, conducted primarily with a view to putting sites on public display, excavation became rescue-led. The following is a survey of recent work in Orkney. It is not intended to be comprehensive, but highlights those sites which are relevant to a discussion of the maritime cultural landscape.

During the 1970s NOSAS, the North of Scotland Archaeological Services, was established under John Hedges as a rescue team conducting excavations and some aerial reconnaissance of threatened sites. At the same time Chris Morris established the Viking and Early Settlement Archaeological Research Project (VESARP) in Durham (Morris, 1993), excavating a series of sites in Birsay Bay (gaz. nos. 56; 60; 86; 93), the Brough of Birsay (Hunter & Morris, 1981; Hunter, 1986b; gaz. nos. 2, 51, 52 & 53) and the Brough of Deerness (Morris, 1987; gaz. nos. 144 & 145).

Between 1969 and 1972 Don Brothwell excavated the eroding site of a medieval chapel and cemetery at Newark, Deerness (gaz. nos. 95 & 96). Neither this site nor the settlement at Westness, Rousay, initially excavated in 1962/3 and extended to the associated cemetery between 1978 and 1980, has reached final publication (Kaland, 1973; 1982; gaz. nos. 27, 28, 29, 30, 31). John Hedges excavated Saevar Howe in 1977 (Hedges, 1983; gaz. nos. 58 & 59) and Anna Ritchie excavated a farmstead at Buckquoy (Ritchie, 1977; gaz. nos. 49 & 50), close to an Iron Age site uncovered by F.T. Wainwright ten years earlier. Peter Gelling excavated at Skaill, Deerness but unfortunately died before the final publication was complete (Gelling, 1984; gaz. no. 39). In 1978 McGavin conducted the only urban excavation at Kirkwall where a Norse jetty was uncovered (McGavin, 1982; gaz. no. 169).

Field survey techniques were introduced in the 1980s by Morris, Batey and Johnson at the Earl's Bu, Orphir; Lavacroon, a Norse industrial site nearby (Batey with Freeman, 1986; Johnson, 1990; gaz. nos. 54; 81; 99) and the Bay of Skaill (Morris, 1983; gaz. no. 153). The first modern excavation of an islet site, at Brettaness, Rousay was carried out by Jackie Marwick (Marwick, 1984; gaz. no. 175). In the 1980s John Barber excavated in Birsay village to locate Earl Thorfinn's minster mentioned in the *Orkneyinga Saga* (Barber,

1982; gaz. no. 135). Between 1984 and 1988 John Hunter surveyed and excavated the farm-mound at Pool (Hunter, 1983; 1984; 1990; 1991; Hunter *et al*, 1993; gaz. nos. 1 & 4), one of many sites located during island surveys by the Orkney archaeologist, Raymond Lamb, in the 1980s (Lamb; 1980; 1982; 1983a; 1984; 1987; 1989). A Norse mill was excavated at Orphir over several seasons by Morris & Batey (Batey, 1992a; gaz. no. 99). Rescue excavations instigated at Tuquoy, Westray in the early 1980s were continued in 1988 and 1993 (Owen; 1983; 1984; 1988; 1993; gaz. no. 21).

The present author's interest in the maritime cultural landscape of Orkney began in the 1990s with a survey of boat nausts on the island of Papa Westray during 1990 (Bowman, 1990; gaz. no. 17) and a survey of an islet site, St. Tredwell's Brough, on the same island in 1991 (Bowman, 1991; gaz. no. 18). The surveys produced evidence for the rate of coastal and topographic change around the island. In 1990 Historic Scotland conducted rescue excavations of a broch on the coast near St. Boniface's chapel, Papa Westray confirming the extent to which the coast was eroding. Only half of the circular structure survived. The excavations also produced evidence for Norse activity in the area, although no structures were assigned to that period (Lowe, pers. comm.). In 1991 John Hunter excavated boat nausts at Hurnip's Point, Deerness. This was only the second time a naust had been excavated in Orkney (following the excavation of a rectangular boat naust at Westness, Rousay in 1963). The nausts turned out to be post-medieval in date. Later that year Archaeological Operations & Conservation Scotland were called in to excavate the remains of a Viking boat burial in advance of its destruction in winter storms (Dalland, 1992; gaz. no. 45). The present author assisted in that excavation.

Surprisingly, since 1985 only one new Norse site has been excavated, the boat burial at Scar, Sanday (Dalland, 1992; gaz. no. 045). This reflects both the lack of new research directives and funding. Excavation of Norse maritime structures is limited to two sites: McGavin's excavation of part of the twelfth century waterfront at Kirkwall (McGavin, 1982; gaz. no. 169) and Kaland's excavation of a boat naust at Westness, Rousay (Kaland, 1973; gaz. no. 029).

1.3.1 Limitations of recent fieldwork

Site distribution

Many medieval sites in Orkney survive today as conspicuous standing monuments or earthworks, and, not surprisingly, these monuments (e.g. chapels and castles) were among the first sites to be studied. Farm mounds were only recently recognised (see 2.1.2). Coastal change too, is a factor in both the survival and the discovery of archaeological sites. In the absence of diagnostic artefacts, excavation, or some historical association, however, it

is often difficult to date such sites which characteristically consist of midden material and the remains of dry stone structures.

The few modern excavations which have taken place in the islands (approximately eighteen programmes since 1970) are unrepresentative of the period, both in the geographical and chronological distribution of excavated sites and in terms of settlement hierarchy. The concentration of work in Birsay Bay, for example, whilst providing a clearer picture of settlement density and continuity in this one area of Mainland Orkney does little to elucidate the picture elsewhere. Similarly as a result of the destruction of sites caused by coastal erosion necessitating rescue excavation much more is known of coastal settlement than of the interior. Settlements doubtless existed around the shores of lochs, but with the exception of two islet sites (gaz. nos. 019; 175) and the possible castle at Gernaness, Stenness (gaz. no. 100) none has been excavated.

Unfortunately, this coastal bias does not extend to the inter-tidal and underwater zone, the subject of this thesis, where there is great potential for the discovery of shipwrecks, harbour and jetty structures, slipways, hards and landing places, bridges, portage sites, navigation markers and ballast sites. No work has previously been done in this area.

The antiquarian tendency towards excavating high status sites named in the *Orkneyinga Saga* (1.2) continues to dominate rescue archaeology. Hence recording and limited excavation programmes to assess winter storm damage to the Late Norse settlement at Tuquoy, Westray, associated with the Halflidi of the *Orkneyinga Saga*, took precedence over the apparently similar settlements being destroyed at Saviskaill Bay, Rousay (gaz. no. 147) and Cross Old Kirk, Sanday (gaz. no. 014). The erosion of farm mounds and more ephemeral settlement traces continues unchecked. Similarly the rich boat burial at Scar, Sanday (gaz. no. 045) was excavated immediately upon discovery in 1991, but would a simple unaccompanied cist burial have been given the same treatment? In the absence of any published cemetery excavations the investigation of such burials should be a priority.

Virtually nothing is known of settlements spanning the thirteenth to fifteenth centuries AD, in part because many of these sites are still occupied. In this respect it is somewhat disappointing that there has been so little excavation in Kirkwall (gaz. no. 136) and that archaeological considerations are not part of the planning process here. Development at individual farmsteads and the extraction and construction industries have destroyed an unquantifiable amount of information.

Finding sites - Geophysical and chemical surveys

In view of the upstanding nature of much of the archaeology, even from the Bronze Age and Neolithic periods, scientific archaeological prospection techniques are often

considered unnecessary or unhelpful. Recent applications show this to be untrue. At Lavacroon, Orphir (gaz. no. 081) fieldwalking characterised the site as an iron working centre. The remains of two structures were identified subsequently by geophysical survey. Resistivity survey was also used successfully at the Bay of Skaill (Morris, 1983), Birsay Bay, area 3 (Morris *et al*, 1989) and at the Round Church, Orphir (Johnson, 1990). Dalland used a combination of resistivity survey and contour survey close to the site of the boat burial at Scar, Sanday in an attempt to pick up settlement traces with some success (Dalland, pers. comm.). Hunter used both magnetometer and resistivity techniques in advance of excavation at Pool, Sanday to locate trenches (Hunter, 1984). The techniques clearly picked up concentrations of archaeological activity and the extent of the farm mound. Hunter conducted both magnetometer and resistivity surveys at the Brough of Birsay. The results (Hunter, 1986, 221-4) were only successful in part due to the magnetic effects of the underlying geology. The techniques did locate broad areas of occupation and some individual features, although their function could not be determined.

The existence of structures at each of these sites was known prior to geophysical survey. At the Brough of Birsay and Pool the techniques were used in conjunction with excavation, the idea being as much to develop the techniques by comparing the excavation and survey results as being a guide to the location of trenches. At the other sites the surveys were intended to characterise the nature of the sites without excavation.

Surprisingly little use has been made of phosphate and magnetic susceptibility analyses, although these have been much used in studies of Iron Age settlement in Norway to determine the function of buildings as byres or dwelling. Phosphate analysis was used at Buckquoy on a silty fill from a drain in house 3. The results confirmed the excavator's interpretation that the building was a byre (Ritchie, 1977, 85).

Aerial photography

The National Monuments Record in Edinburgh houses a complete RAF and Ordnance Survey vertical and oblique air photographic coverage of Orkney at various scales. Additional recent coverage (since 1960) is housed by the Ordnance Survey in Southampton. The highest level of resolution of the photographs is 1:10,000. From the original photographs it is difficult to detect visible earthwork sites such as the Brough of Deerness, even less a buried settlement site such as Pool, Sanday. The photographs were taken to aid mapping and not to identify archaeological sites. That said they have never been systematically studied with that end in mind. Aerial photography might be usefully employed in locating upland earthwork settlements in Hoy and Mainland and to locate crop marks in periods of drought. Identifying sites in areas under pasture and dunes is virtually impossible using this technique, visual inspection on the ground being more successful.

The use of aerial photography for archaeological purposes in Orkney has been rare. Cambridge University Committee for Aerial Photography (CUCAP) photographed the Brough of Birsay in the 1950s. This was followed by a programme of photography of specific sites by John Dewar for the Royal Commission on the Ancient and Historical Monuments of Scotland. In the late 1970s Chris Morris photographed several areas then under investigation and in the early 1980s Dennis Harding photographed the Viking cemetery at Westness and other sites on Rousay, Sanday and North Ronaldsay. The North of Scotland Archaeological Services also conducted a limited programme of flying, but in virtually all cases the intention was not prospection for new sites but the investigation of known sites in more detail.

Fieldwalking

Fieldwalking of ploughed fields was used with success at Lavacroon, Orphir (see above) and also in the discovery of a Neolithic settlement at Barnhouse, Stenness (Richards; 1992). There is certainly potential for its wider application where land use regimes permit. Only a small area of land in Orkney is ploughed (in rotation) to produce crops for animal fodder, the majority being given over to pasture or rough grazing.

1.4 Research frameworks

This section reviews recent and on-going research frameworks in Viking and Late Norse Orkney studies and their relevance to the present work: the Viking settlement; Norse and native interaction; the introduction of Christianity; archaeological typologies and landscape studies.

The Viking settlement

The basic lines of enquiry discussed above which were established by Clouston and others early this century remain primary concerns for archaeologists today. Wainwright (1962) used historical, saga, linguistic and archaeological evidence to explain the chronology of the Scandinavian settlement, its scale and intensity, the origin of the settlers and its impact on the native inhabitants. He assumed that raids on English and Irish monasteries at the end of the eighth and the beginning of the ninth centuries were carried out from bases, possibly in the Northern and Western Isles, but considered that these might have been temporary camps. The sagas apparently support this interpretation: they describe Harold of Norway wiping out pirate bases in the islands and establishing the Orkney Earldom in the ninth century. Archaeological examples of such bases exist in the Western Isles and the Isle of

Man, the small stone-built fort excavated at The Udal, North Uist, dated to the mid ninth century, but there are none in Orkney (section 2.1.2).

From linguistic evidence, both place-names and the Old Norn language, Wainwright argued that the settlers came from south western Norway; the plethora of names represented to him the domination of the settlers over the native population. There is a general consensus now that the language was derived from western Norway, but possibly from the north west rather than the south west (Barnes, 1993, 67).

For the purposes of the present study the Viking period is assumed to have begun in the ninth century AD. Comparisons are drawn between the material culture which makes up the maritime cultural landscape in Orkney not only with that found in Norway, the supposed homeland of the settlers, but also with other Norse colonies. Significant to the debate about the origin of the Viking settlers in Orkney is the provenancing of sand grains lodged in caulking in the remains of a ninth century boat at Scar, Sanday to an area of southern Sweden (chapter 6).

Native and Norse interaction

Questions regarding the interaction between Norse and native came to a head in the 1970s when Ritchie excavated the farmstead at Buckquoy, Birsay (Ritchie, 1974 & 1977; gaz. no. 050). She claimed a continuity in artefact types between the Pictish and Norse levels as proof of cultural interaction. At Pool, Sanday (gaz. no. 001) the construction in the Viking period of new sub-rectangular building forms, the presence of steatite and the introduction of flax cultivation (all changes associated with Viking settlement) did not preclude the continued use of the Iron Age round house into the eleventh century and the artefact assemblage showed a mixture of Pictish and Norse types in Viking levels (Hunter, 1990, 189). Morris's excavation of a figure-of-eight building, previously considered a typically Pictish form, at Red Craig in Birsay Bay (gaz. no. 093) complicates the picture still further since it was radiocarbon dated to the eighth to tenth centuries and although no steatite was found there was evidence for flax cultivation (Morris *et al*, 1989, 266). Of course, the cultivation of flax and introduction of steatite instead of pottery need not imply any cultural change. The debate is a complex one, and is irrelevant to the present study since I make no attempt to attach ethnic labels to the structures and artefacts which make up Orkney's maritime cultural landscape.

The introduction of Christianity

The introduction of Christianity to Orkney and its organisation is one area which has received considerable attention (Mooney, 1923; Cruden, 1958; Radford, 1962 & 1983; Lamb, 1976 & 1983b; Lowe, 1987). The main issues under discussion are the range of

burial practices which existed, the existence of Norse monastic sites, possibly predating the traditional date of conversion to Christianity, and the question of the survival throughout the Medieval period of the earlier Pictish Church, as well as the range of Norse chapels and their organisation into *urisland* districts based on sixteenth-century rentals (section 2.1.3).

The distribution of chapels, burials and cemeteries is important to the current work in two ways: it is primarily coastal and complements well the distribution of settlements, so much so that their location often reveals associated and as yet undiscovered settlement sites.

Archaeological typologies

Traditionally medieval archaeology was based upon the construction of typologies of structures and objects. Excavation over the last twenty years has shown that this evolutionary approach to building studies which charted the development of the longhouse, where rectangular or sub-rectangular were Scandinavian and round or elliptical were native, is too simplistic. Excavations at Pool (Hunter *et al*, 1993) and Red Craig (Morris *et al*, 1989) have demonstrated that typically "native" structures were inhabited during the Viking period, and rectangular house plans were known in Orkney in the Early Iron Age, such as the Knowe of Burristae, Westray (Lamb, 1984). Taking a suite of radiocarbon dates from closely stratified layers now affords the most precise means of dating such structures.

Wainwright (1962, 147) asserted that grave goods could only be dated on stylistic grounds to within about a hundred years. There are several reasons for this. Firstly, the heirloom factor. An old brooch might be buried with one of recent manufacture, but in an apparently closed find such as a grave, the two might mistakenly be assumed to be contemporaneous. Crawford's comment (1987, 121) on the dating of the grave at Buckquoy, Birsay is apposite here. The grave was dated by a coin to the second half of the tenth century, but in isolation the other goods would have suggested an earlier date. In addition early typologies were derived mainly from finds in Scandinavia. There might have been a delay between the introduction of such styles in the homeland and the colonies; or the development of art styles of the two might have been entirely separate (Morris, 1985).

Steatite, the predominant fabric used in domestic vessels of this period and which is found on settlement sites, is not closely datable. There are no outcrops in Orkney and all steatite must have been imported, probably from Shetland where there were several quarries. A recent study of steatite found in Shetland (Buttler, 1989) outlined the range of artefacts made from steatite, considered typologies for the different classes and went some way to sourcing the stone to particular quarries using hand specimens. Ritchie (1974) also proposed a typology of steatite vessels based on a stratified sequence recovered from Jarlshof. Some pottery was produced locally (Pool, Sanday) and is dated by association.

Problems of chronology and the range of techniques used to date the sites in the gazetteer are discussed in more detail in chapter 2.

Economic and landscape studies

Recently attention has focused upon the study of the landscape and palaeoeconomy using techniques of environmental analysis and soil science. Hunter and Morris instigated programmes of wet-sieving and flotation on sites in Birsay Bay (gaz. nos. 056, 060, 086, and 093), the Brough of Birsay (gaz. no. 051), the Brough of Deerness (gaz. no. 040) and Pool, Sanday (gaz. no. 001). These sites have produced evidence of crop cultivation, the physical environment and exploitation of marine resources, only previously available from ethnographic studies and from the limited environmental programme carried out at Buckquoy (gaz. no. 050), The Brough of Birsay (gaz. no. 051) and Westness, Rousay (gaz. no. 027), (Kaland, 1982; see chapter 4). Investigations into farm mounds in the 1980s (Davidson *et al*, 1983 & 1986) marked the first detailed pedological analysis of medieval sites (section 2.1.2).

At Tuquoy Owen (1988) established the extent of the site by coring at intervals and took a core for environmental analysis from the drained Loch Tuquoy. Davidson *et al* (1986) used similar pedological testing to investigate field mounds in Sanday. Such pollen and pedological analyses are crucial if we are to reconstruct the medieval landscape of Orkney. Coastal change, reclamation and modern farming techniques and practices have completely altered the landscape in a way which did not happen in Shetland (Lamb & Turner, 1991, 168).

Summary

The study of the maritime cultural landscape is essentially a landscape and economic study. It is a product of the geographical, ecological and economic archaeological approaches of the 1960s and 1970s in Scandinavia (Myhre, 1991) and the 1970s and 1980s in the British Isles which focused on social adaptation (individual and collective) to environmental imperatives (Kirch, 1986). It involves establishing the natural maritime environment (the coastline; topography; distribution of natural resources; climate; current patterns between the islands) of the period and assessing the evidence for its human exploitation in the distribution and function of settlements, the subsistence economy of these settlements, the use of exchange mechanisms to overcome the unequal distribution of natural resources and the use of boats for inter-island and long-distance communication via a network of sea routes.

CHAPTER 2 Introducing the material evidence of the *maritime cultural landscape* of Viking and Late Norse Orkney

2.1 The range of archaeological sites

My purpose in this chapter is to provide a synthesis of the detailed information presented in the gazetteer (appendix 1) with regard to the range of archaeological sites which make up the maritime cultural landscape of Viking and Late Norse Orkney, their chronology and historical context. The gazetteer contains records of all known Viking and Late Norse sites throughout Orkney. Several potential (undated or unconfirmed) sites, identified through fieldwork, from the *Orkneyinga Saga* or medieval rentals are also included. The compilation and format of the gazetteer are discussed only briefly here. A more detailed analysis can be found in appendix 1.

The gazetteer summarises the corpus of data upon which this thesis is based. It comprises over 180 entries which are organised into thirteen categories of site: settlements, maritime structures, burials, hoards, cemeteries, isolated finds, chapels, defensive sites, monasteries, *thing* sites, runes, *bordland* territories and industrial sites (figure 6).

The gazetteer entries describe the aspect of each site, its geographical distance from the nearest landing place, dates of use, any excavation history and summarise the structures, finds and environmental data. These data are analysed in this and succeeding chapters to investigate patterns of site location and chronology, the subsistence economy and inter-island trade and communication. Fields on the rate of erosion and site survival are used in Chapter 3 to assess site visibility, survival and coastal change in the last 1000 years.

The information in the gazetteer is derived from a variety of sources: national and regional sites and monuments records, published excavations and surveys, the writer's fieldwork, secondary historical and linguistic sources, ethnographic and geographical studies. This multi-disciplinary approach is intentional (see 1.1.1)

The gazetteer is intended to serve both as an index to further information on individual sites for research purposes and as a heritage management tool - to enable an assessment of the relative importance of sites and to identify those under threat from marine erosion so that rescue funds can be targeted to maximise information retrieval. A guide to the use of the gazetteer precedes appendix 1. Appendices 2 and 3 provide up-to-date summaries of radiocarbon dates and coin finds from the sites.

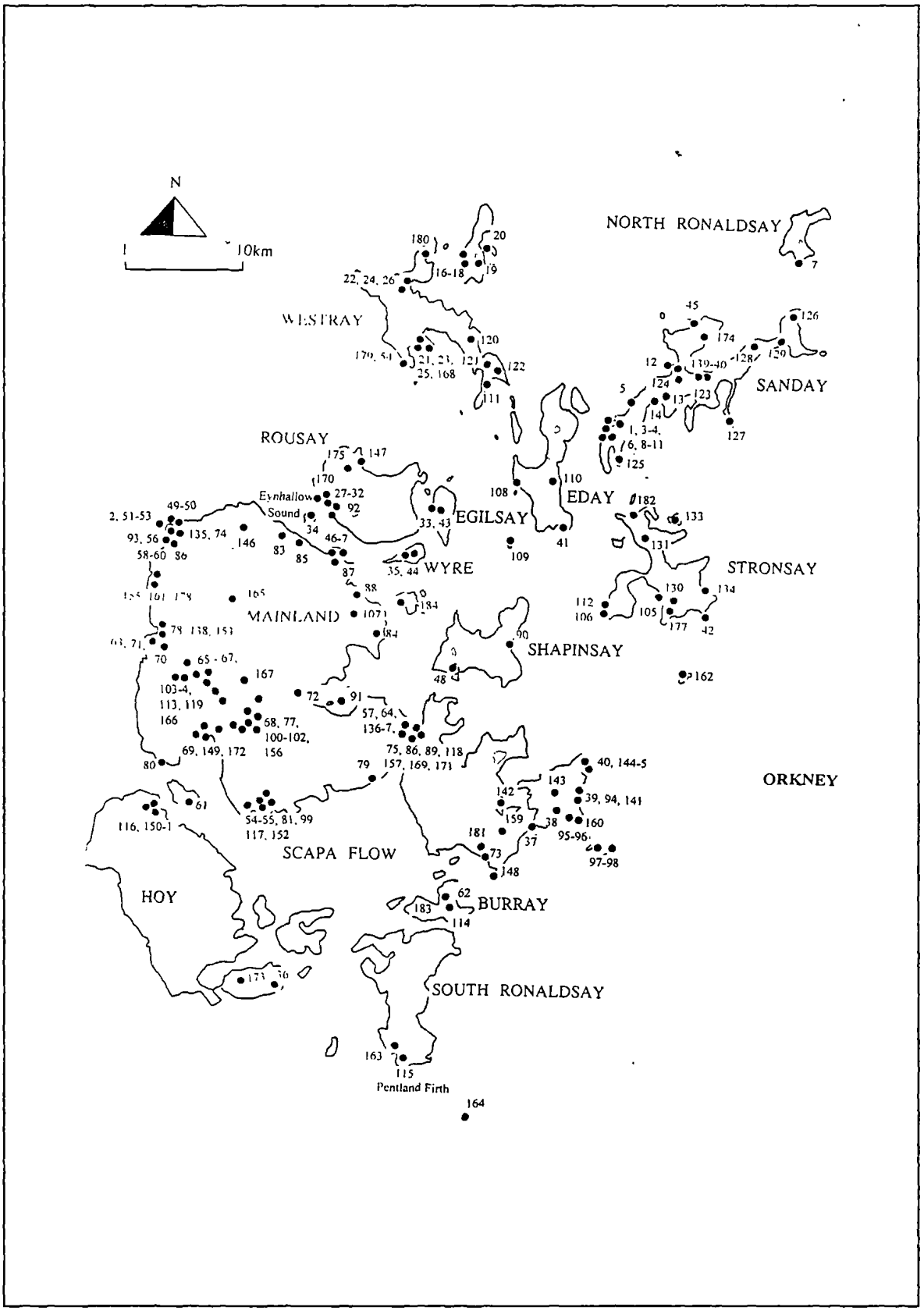


Figure 6 The distribution of gazetteer sites

The existence of maritime structures and other sites in the gazetteer which were purposely located on the coast with a view to exploiting the sea as a means of communication and source of food, are central to the concept of a maritime cultural landscape. Accordingly, these sites are afforded most attention here. Hoards of precious objects and coins, isolated finds of imported architectural stonework and other manufactured goods are discussed in chapter 5 which is concerned with trade and exchange. Section 2.1 is essentially descriptive; it outlines the range of sites represented, assesses the quality of the data and indicates where information is wanting. Thereafter I discuss the historical context of the sites (2.2).

The data set has inherent biases and inadequacies related to the source (and often the lack) of information, the history and nature of antiquarian and archaeological research in Orkney and factors governing site survival and discovery. Some of these biases which affect the range of sites represented in their status, chronology and geographical distribution, were outlined in the preceding chapter (1.3).

Category	**Number of sites in the gazetteer**
Maritime structures	16
Settlements	35
Bordland territories	23
Thing sites	3
Defensive sites	14
Industrial sites	4
Chapels	26
Monasteries	9
Burials	16
Cemeteries	14
Hoards	5
Isolated finds	14
Runic inscriptions	5
Total no. of sites	184

Table 1 *Types of site represented in the gazetteer*

Much of this chapter is necessarily speculative, but I hope it will assist archaeologists to define areas requiring further research in Orkney as well as establish a framework within which the current study is set. I intend to look beyond particular questions previously posed such as the Norse/Native interface, building and artefact typlogies and historical detail to gain an overview of the settlements. This is by no means to belittle the sound work that has been done in Orkney over the last couple of decades (Morris, Hunter, Lamb, Ritchie, Crawford *inter alia*), but merely an attempt to gain an overall impression of life in Medieval Orkney from a new maritime perspective.

2.1.1 Maritime Structures

In 1983 McGrail offered the first critique of what he termed maritime structures, that is structures which have a specifically maritime role: boat building sites, landing places and hards, boat shelters or houses, wharfs and jetties, blockages and harbour defences, fish weirs and stake nets, causeways, flood defences and sea walls built for reclamation. To this list we might add harbours, ballast sites, slipways, anchorages, jettison sites, navigation beacons, portages and shipwrecks (Westerdahl, 1989). McGrail omitted discussion of canals, crannogs, fish ponds, salt pans, tidal mills and water wheels, but evidently considered these also to be maritime structures (1983, 34).

With the exception of boat houses maritime structures have received little attention from archaeologists working in this period in Orkney and yet they are central to the idea of a maritime cultural landscape. They provide direct evidence of maritime activities such as fishing, and waterborne trade and transport. They were situated on the coast and on inland waterways. Their remains survive both on land and underwater. Navigation beacons, for example, often lay hundreds of metres inland in prominent locations, so as to be visible from the sea. Much of the evidence for maritime structures in Orkney is circumstantial. Only sixteen such structures appear in the gazetteer. The evidence for harbours, anchorages and landing places is particularly tentative; it is based largely upon recent practice and geographical evidence for coastal change and submarine topography. The existence and distribution of navigation beacons is based upon place-name evidence.

Being coastal and in many cases situated directly on the foreshore maritime structures are most vulnerable to erosion. The concentration of research into other site types means that much information on maritime structures has probably already been lost to the sea. To prevent further loss it is a matter of urgency that these sites appear on survey and fieldwork agendas.

Harbours

In the Viking period boats and ships were designed to be beached and harbour constructions would be unneccessary where there were suitable sandy beaches. The early eleventh-century wrecks from Skuldelev, Denmark showed wear on their keels consistent with beaching. The use of informal harbour sites is evidenced from oral tradition such as Pool Bay, Sanday (gaz. no. 004), known locally as "the Viking harbour" and where there is some suggestion that the natural rock formation has been enhanced to form a sort of harbourwork. The use of the bay at Osmundwall, South Walls (gaz. no. 036) is remembered in the *Orkneyinga Saga* as the site of the baptism of Earl Sigurd the Stout in 995 by King Olaf Trygvasson. Local tradition also supports the existence of Viking harbours at Weelie's Taing, Papa Westray (gaz. no. 017) and the Dane's Pier, Stronsay (gaz. no. 042) which might both be modified rock formations, and Elwick Bay, Shapinsay (gaz. no. 048). Old Admiralty charts combined with a knowledge of medieval settlement patterns reveal the location of other natural harbours. Cleared areas, slipways and boat shelters mark the location of landing places. More ephemeral indicators such as mooring posts may have existed once, but are unlikely to be found now.

The only certain jetty construction is in Kirkwall. It was probably built in the eleventh century during construction of St. Magnus Cathedral. The provision of a jetty would undoubtedly have assisted in the offloading of the building stone which was imported. Was there therefore a similar construction at another port? The jetty at Kirkwall was drystone built and the excavated area measured 2m long by 0.5m high. It survived as three or four courses of stone and sat upon the surface of a beach. The excavators also found a deposit of red freestone fragments in a silty matrix sloping to a gradient of 1:20, but not water-worn. This was probably a hard or beach landing place for boats (McGavin, 1982, 401). The location of this structure provides information on the changing shoreline at Kirkwall (chapter 3).

The excavation in Kirkwall was on a very small scale and it is highly likely that the harbour at Kirkwall in the medieval period comprised a series of wharfs and jetties, not unlike other harbours at that time, but built in stone not timber.

Boat shelters (sometimes called boat houses, boat sheds, nousts or *nausts*)

Noust is a term used in Orkney today to describe an unroofed boat shelter contrived on the shoreline. The word derives from the Old Norse and modern Norwegian *naust*, meaning a roofed *boat house*. To avoid ambiguity all such structures are referred to here as *boat shelters*. Use of the term boat house is restricted to those examples which were definitely roofed.

Just one medieval boat shelter has been excavated in Orkney, at Westness, Rousay (gaz. no. 029). The structure was rectangular, three sided, open to the sea, or perhaps provided with a wooden door and would originally have supported a roof. It lay above a cleared slipway. Two building phases were identified in the stratigraphical sequence but there was no absolute dating evidence. It originally measured 10m x 5m but has been shortened by erosion to 8m.

A second possible medieval boat shelter was recorded during survey work at Tuquoy, Westray in 1988 (gaz. no. 168). It was described as a boat-shaped structure, eroded to the south, poorly constructed with single-faced walls and measuring 2.7m by 1.9m. It is thought unlikely to have supported a roof structure and is interpreted as either a boat shelter or a net-drying area.

Boat *nousts* are still used in Orkney. They are boat shaped with curved sides and have no provision for a roof. Figure 7 shows two of four stone-lined *nousts* at the aptly named Nouster, Papa Westray. These were constructed in the nineteenth century.

Figure 7 Two modern boat nousts at Nouster, Papa Westray (Photo: author)

Tens of Iron Age and medieval boat houses have been excavated in western Norway; hundreds more are known (Rolfsen, 1974; Myhre, 1985; Hinsch, 1960). The structures in Norway vary (figure 8) in length from 10 to 30m and are up to 8.5m wide. They were built from two curving side walls of turf on top of stone, with one end open to the sea and at the rear a timber wall. There were some roof supporting timbers close to the walls and possibly a timber lining to the wall. The roofs were covered with birchbark and turf. In some cases the roof may have rested directly on the walls (Hinsch, 1960, 12).

The structures at both Westness and Tuquoy differ from the boat shelters found in Norway; the structure at Westness because of its rectangular shape and the one at Tuquoy due to its small size and lack of a roof. Christensen (1977, 117) referred to medieval Icelandic literary sources using two words to designate boat shelters - *naust* and *hrof*, where the *naust* was a roofed boat house and the *hrof* was a more flimsy structure, possibly a trench or a pair of walls where the vessel was simply covered with boards or cloth (as is the case in modern Orkney *nousts*). The structure at Tuquoy seems to belong to the latter class.

The position of boat shelters, and more so landing places and slipways is a good indicator of coastal change. Where there has been extensive coastal erosion a *boat shelter* might be revealed through coastal survey, as happened at Whitehowe, Papa Westray (gaz. no. 017). The structure lies some 3m above the present beach level and is now buried by two metres of overburden (Bowman, 1991a).

One of the problems in identifying medieval boat shelters is dating the sites in the absence of diagnostic artefacts or samples suitable for radiocarbon assay. In 1991 John Hunter excavated two of four boat shelters at Hurnip's Point, Deerness. One measured 10m by 5m and the other 8m by 4m. They proved to be of a similar construction to those at Nouster, Papa Westray and probably belonged to a nineteenth-century herring fishing station (Hunter, 1992).

Slipways

Slipways are found in association with boat houses and also on their own, for example at the Brough of Birsay (gaz. no. 002), although some believe this to be rather a roadway. In any case boats were doubtless pulled up it.

Landing places

As stated above *landing places* might be nothing more elaborate than natural sandy inlets (geos), bays or cleared areas on rocky coasts, or *hards* such as that found at Kirkwall (see above). There are hundreds of these around the islands. Being natural features, in many cases still in use today, they are particularly difficult to date.

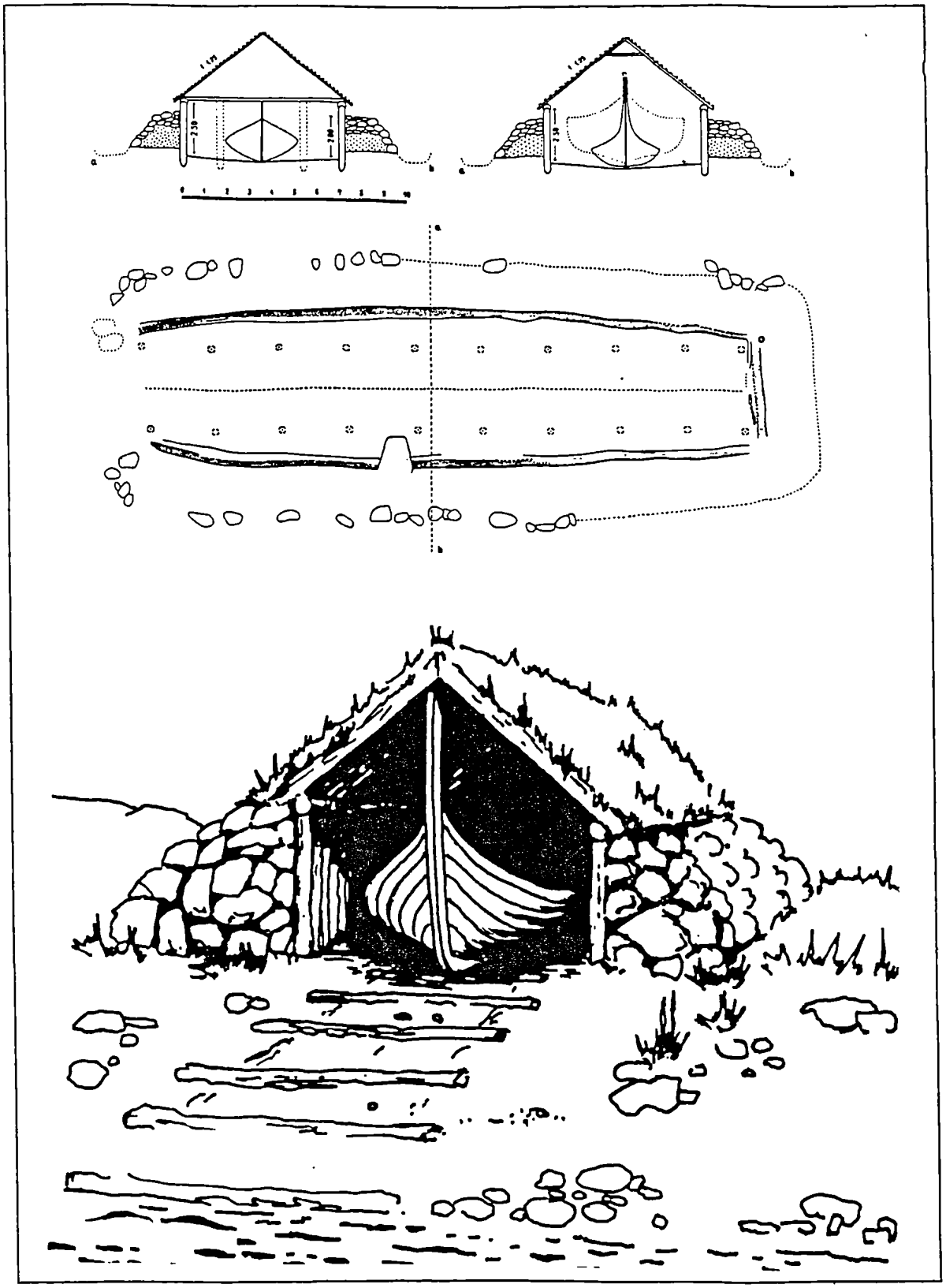


Figure 8 An excavated medieval boat house from Bjelland, Stord, Hordaland, Norway and its reconstruction (after Rolfsen, 1974)

Of the 90% of gazetteer sites which were considered coastal (i.e. those lying within 100 metres of the sea) 70% or just under 100 sites lay within 50m of landing places (figure 9) suitable today for small boats of the type used in the Viking and Late Norse periods (chapter 5). 88% of all sites lay within 200m such landing places. Whilst it is evident that the coastline of Orkney has changed since the medieval period (chapter 3) the most dramatic changes are localised and it is unlikely that the overall distribution and number of landing places has changed significantly. It appears, therefore that medieval sites were located on the coast in order to exploit adjacent landing places.

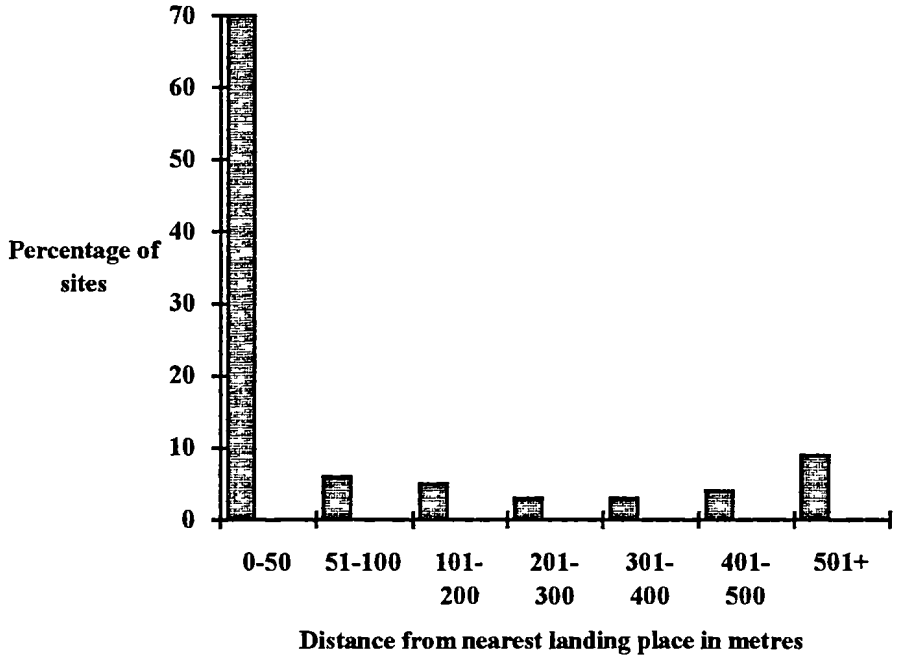


Figure 9 Graph showing the proximity of gazetteer sites to landing places

Ballast sites

Ballast sites, mounds of stones and other material which once formed the ballast for boats, are a common feature of a maritime cultural landscape, although they often go unrecognised (Gale, 1993). That there are no recorded ballast sites, of any date in Orkney, does not therefore imply that none exists; the evidence for these sites is often tenuous. Some so-called Bronze Age burnt-stone mounds, accumulated heaps of fractures pot-boilers used in cooking throughout Prehistory, listed in the Sites and Monuments record might be ballast sites. Place-names may reveal the locations of others.

On Stronsay at a place called Cobbie Roo's Lade (gaz. no. 106) there is a possible ballast site. Place-name evidence and local tradition support a medieval date for the site. The place-name refers to Kolbein Hruga, a famous character in the *Orkneyinga Saga* who built a castle on Wyre (gaz. no. 035). The site location given by the Ordnance Survey marks the position of a heap of stones on a boulder ayre. There is no landing place close by, so this is unlikely to be a ballast site. Further along the coast, and adjacent to the only landing place on this stretch, however, there are two mounds of rounded cobbles, half-buried. Is this a ballast site? Was the place-name wrongly located by the Ordnance Survey? This theory is supported by the position of the site close to the only peat beds on the island where boats laden with ballast might come ashore to replace the stone with a cargo of peat.

Navigation beacons

Beacons serve to aid navigation and are located at vantage points. The locations of many are preserved in the Ward or Fitty Hill place-names which are derived from the Old Norse *viti* meaning fire and *varða* meaning beacon (figure 10). Clouston (1932a) wrote a paper on this topic, but the matter seems not to have been considered since. There may be a distinction between those which were strictly navigation beacons and those which served as an early warning system. A story of the use (and sabotage) of early warning beacons is recounted in the *Orkneyinga Saga*.

One example of a navigation beacon is the series of cairns called Reeky Knowes, or smoky hillocks, overlooking Eynhallow Sound (gaz. no. 087), near the Broch of Gurness, immediately above the nearest landing place. Another is located in Birsay (gaz. no. 146). An excavated mound containing burnt material on the top of Ward Hill in Deerness supports the hypothesis (gaz. no. 143). Navigation beacons occur where the access to landing places, especially geos, is not clear from the sea.

Portages

Places where boats might be hauled overland are also recorded in the place-name record, eg. Eday in Old Norse *Eið* which means isthmus isle (Crawford; 1987, 24). In the Western Isles the location of these sites is preserved in the Gaelic name *Tarbert* which also means isthmus (Fraser; 1978). Hamilton (1956) believed the settlement at Jarlshof, Sumburgh Head, Shetland to be a portage site, since it was situated near a low plain which might be used by vessels wishing to avoid the dangerous circumnavigation of Sumburgh Head. Kirkwall, the main town in Orkney, is similarly located. Just over two kilometres separates Kirkwall Bay from Scapa (ON *Skalp eið*) Bay (Crawford; 1987, 24).

Literary evidence supports the use of such isthmuses. In chapter 76. of the *Orkneyinga Saga* Svein Asleifarson went to Scapa by ship and then travelled overland to Kirkwall.

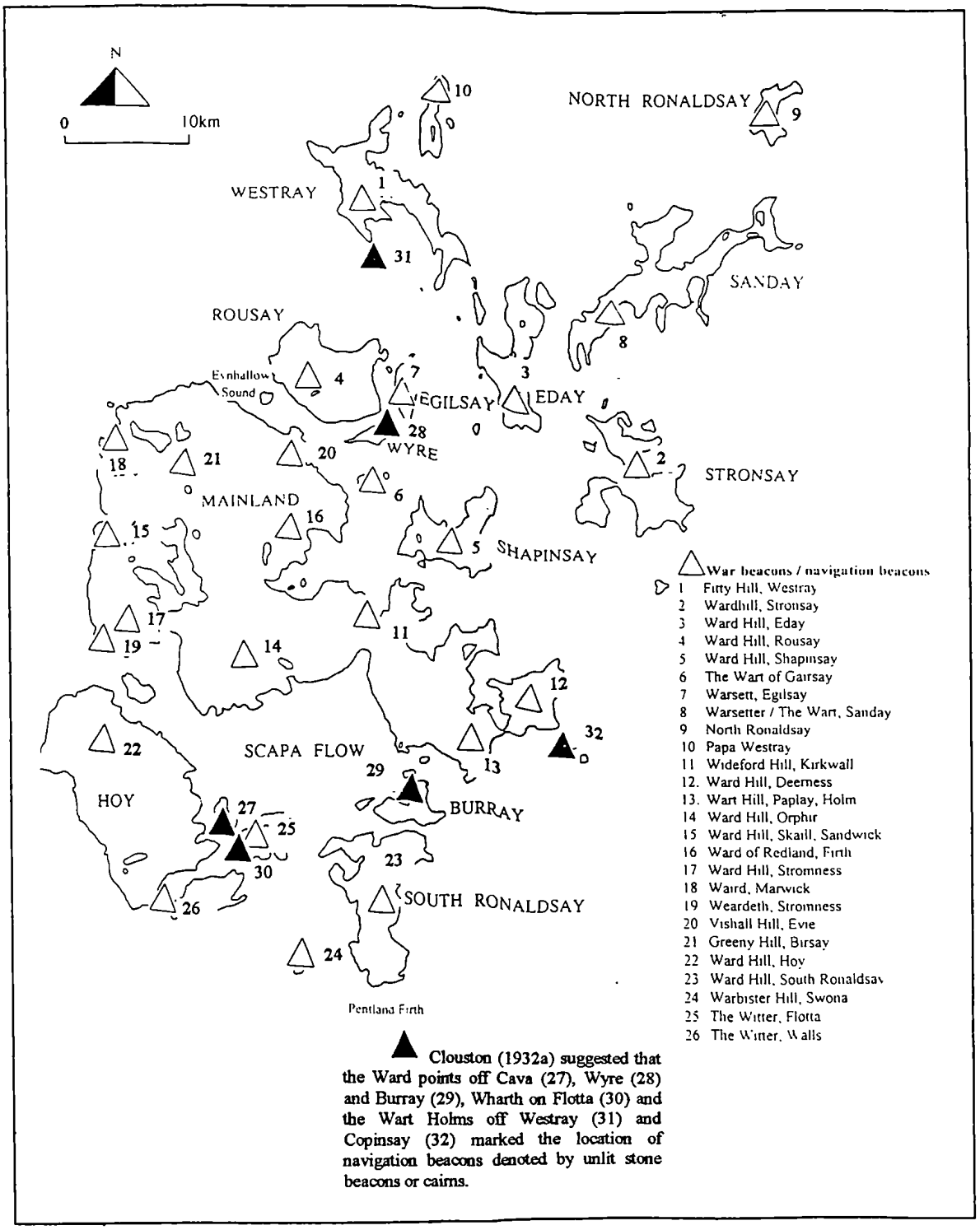


Figure 10 Distribution of beacons (based on information in Storer-Clouston, 1932)

Shipwrecks, jettison sites, anchorages and blockages

Sea routes or shipping lanes are a vital element in the maritime landscape and one where underwater archaeology has an important role to play in the discovery and location of anchorages, jettison sites, shipwrecks and blockages. That such sites exist in Orkney is highly likely, though none is yet known. Thirteenth century chronicles speak of the Danes using underwater obstructions as defences against Slav seabourne raids (McGrail, 1983, 38). The Skuldelev ships formed one such Viking period blockage (Olsen & Crumlin-Pedersen, 1978). Several such sites built from timber and stone have now been investigated in Denmark (Rieck, 1991; Jörgensen & Grön, 1994).

The only work done in this area to date is by Ian Morrison in Shetland. He sought to locate a wreck site described in the *Orkneyinga Saga* and also investigated the marine environment off Jarlshof (Morrison, 1973a; b). The project located the general area of the shipwreck, but no archaeological remains were found. There is certainly potential for extending this sort of work, perhaps by following up records of fishermen's net fastenings with a programme of remote sensing and diving as has been done off the coast of Kent with some success (Dean *et al*, 1992, 20).

In an area where there was so much seaborne activity shipwrecks are inevitable. In a single year in the nineteenth century there were hundreds of wrecks off the British coast (figure 11). In the five and a half centuries of medieval maritime activity in Orkney it does not seem unreasonable to suggest that there must have been many wrecks. Indeed this theory is supported by saga stories of shipwrecks (Small, 1969).

We can reconstruct the location of early modern anchorages from early Admiralty charts (figure 12). Some of these may have served as anchorages for cargo craft in the Viking and Late Norse periods also. Anchorages are identified underwater by collections of rubbish thrown overboard whilst the boat was lying at anchor. Jettison sites are locations were goods were thrown away whilst the boat was underway. There are parallels for such sites in Sweden (Westerdahl, 1989).

Together with sea routes we should consider inland waterways in the form of lochs and rivers. The latter have sometimes been improved to make them navigable by small boats, but there is no evidence for this happening in Orkney. The most logical area for such treatment is the mouth of the Loch of Stenness into the Bay of Ireland. It is now largely silted up, but was probably never deep enough to take craft. In any case goods could easily be transhipped here to boats which would continue the journey inland. Inland lochs should be seen as an extension of the coastline.

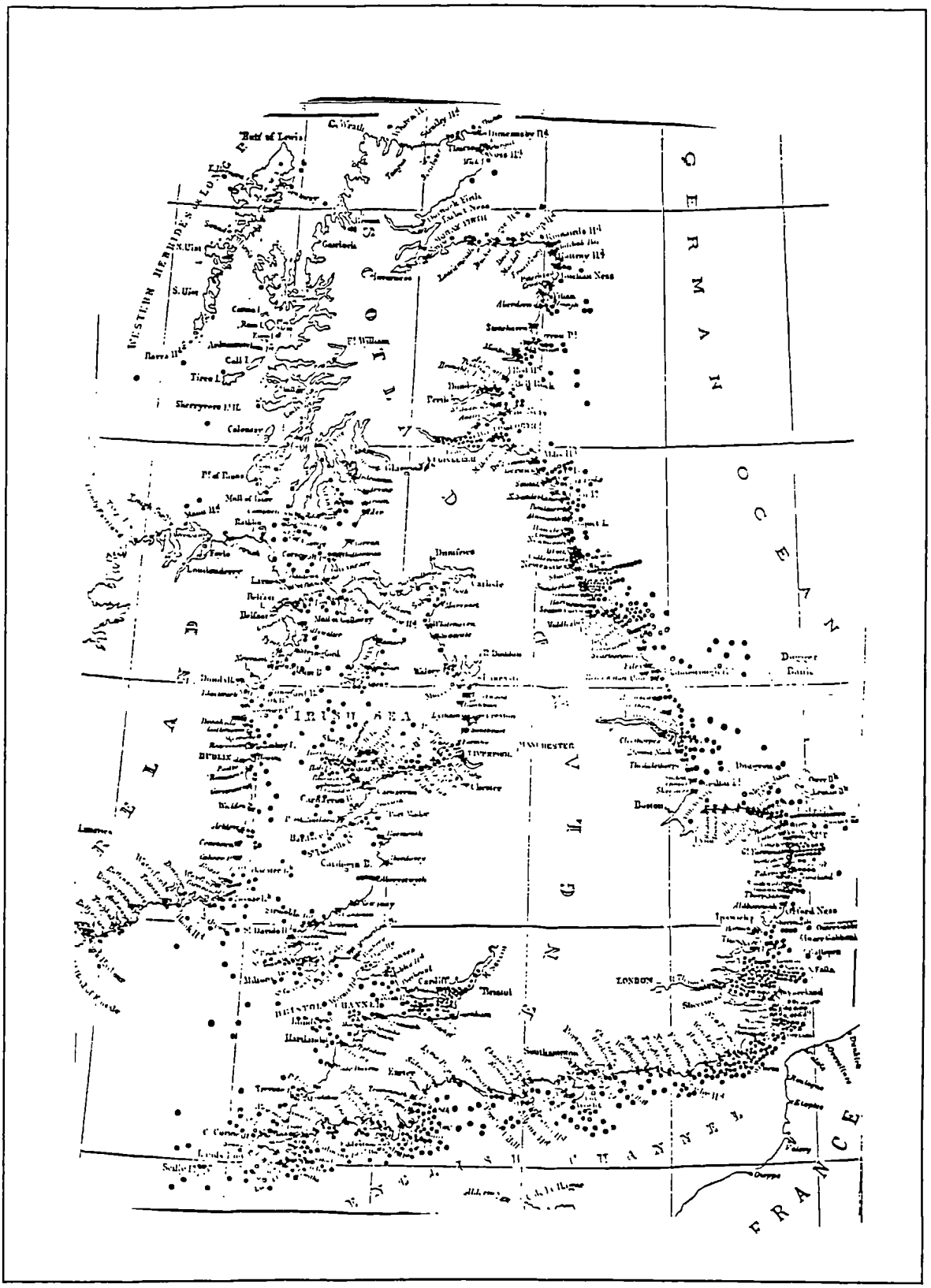


Figure 11 A wreck chart for 1876-77 published by the National Lifeboat Institution (after Dean *et al*, 1992)

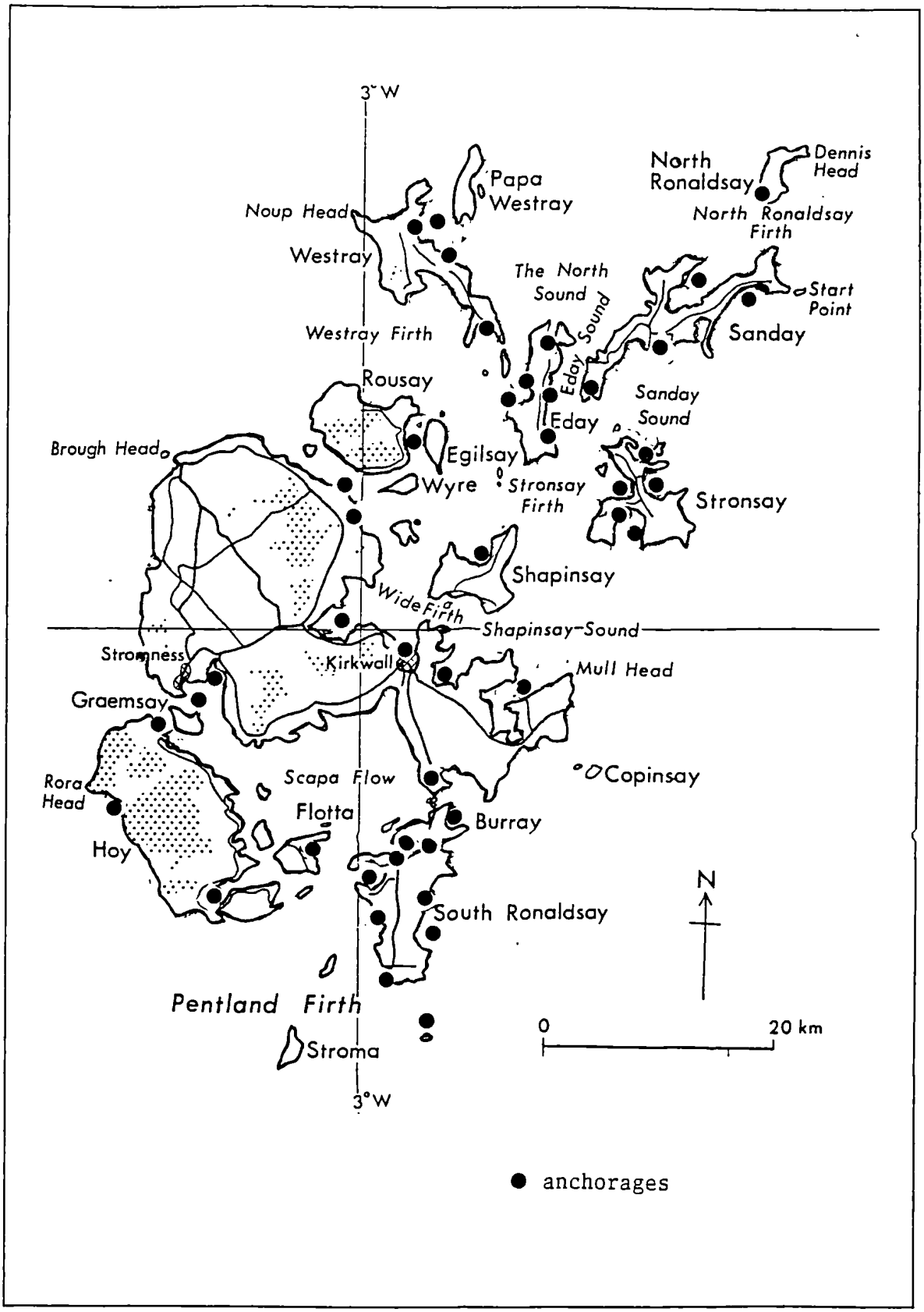


Figure 12 Anchorages in Orkney derived from early Admiralty charts

Boat building and repair sites

Boat building may have been informal, in the open air, beneath elementary shelters, or in boat houses and often leave little trace in the archaeological record. Excavations at Paviken, Gotland, for example, produced over 2000 used and unused boat nails, but there was little structural evidence for boat construction (McGrail, 1983, 34). An eleventh-century shipyard has also been excavated at Fribrödre, Falster, Denmark (Madsen, 1991). The waterlogged remains of around 1700 ships' parts, wood offcuts, boat nails and tools were found, but again little in the way of structures.

No boat building sites have been found in Orkney, although there are several finds of Viking period boats (chapter 6). The distribution of foreign goods in the islands (chapter 5) reveals that there was extensive long distance and inter-island trade. Large ships were apparently ordered direct from Norway (chapter 6; *Orkneyinga Saga*), but although timber was in short supply it is, nevertheless, likely that boats were both repaired and built in Orkney. Inter-island and long distance trade were not introduced for the first time in the Viking period. Boats had been important to the subsistence economy of the islands' inhabitants since Orkney was first settled in Neolithic times, presumably by people arriving from the Scottish mainland with their cattle, sheep and seed in skin or wooden boats (Ritchie, 1985). There was therefore boatbuilding technology in Orkney prior to the Viking period. The only direct evidence of this is an antler chafing piece from the Iron Age Broch of Burgar, Evie, Mainland Orkney (chapter 6). These pieces were fitted to the sides of fishing boats and fishing line was fed through them rather than immediately over the side of the boat, to prevent wear of the *washrail*. The example from Burgar is virtually identical to one found in a Viking boat grave at Westness, Rousay and another found at Jarlshof, Shetland.

Fish weirs and ponds

No Medieval fish weirs, stake nets or fish ponds have yet been identified in Orkney. These traps, made from posts and wattle hurdling, were used from the eleventh century in Ireland, and from the fifteenth century in Wales (McGrail, 1983). The Domesday Book contains references to fish weirs on rivers.

Fish weirs are features of primarily of mud and clay foreshores. Suitable areas exist on the Orkney coast such as St. Peter's Pool, St. Andrews. Alternatively, it is possible that some of the coastal rock formations around Orkney were cut to form weirs and fish ponds similar to those constructed in the early modern period on the industrial North Yorkshire coast (Owen, 1994). Some of those sites listed under harbour might well be reconsidered here.

Causeways and crannogs

It is quite possible that causeways between holms and smaller islands were constructed by adding to natural tombolo beaches. The causeways between South Walls and Hoy island, or between Corn Holm and Copinsay, or Hunda and Birsay, might be examples, but I doubt if this could be proven. Certainly guaging coastal change will be important here (chapter 3).

Causeways in inland lochs certainly were built and the islet sites (sometimes called crannogs, though structly speaking this term is reserved for pile-built wooden structures) of Brettaness on Rousay (gaz. no. 175) and St. Tredwell's Brough on Papa Westray (gaz. no. 019) are two examples. A further eight of these islet sites exist in Orkney, and these may have been occupied in the medieval period (Morrison, 1987). A combination of land and underwater investigations would determine this.

Flood defences and sea walls

No such structure has been found in the isles, though we might expect a major port like Kirkwall to have had some such provision. Erosion must have been a problem throughout the Viking and Late Norse periods just as it is today. One very effective form of sea wall used by farmers today is the construction of herringbone style walls of wedged vertical stones (figure 13). These walls are commonly found beneath both deserted and working farmsteads and boat *nousts* on the coast to prevent erosion of the land. Some may have medieval origins.

Figure 13 Sea wall construction, Skennist, Papa Westray (Photo: author)

2.1.2 Coastal settlement

The majority of gazetteer sites (some 70%; 2.1.1) lay on the coast and were easily accessible from the sea. Even allowing for coastal change (chapter 3) and the length of the coastline, some 1000km, this nevertheless means that settlement was concentrated into just one sixth of the islands' total area of c. 600km^2. This pattern is common in other Norse colonies: in Shetland and the Faroes (Small, 1969) and in Scandinavia (Jörgen, 1991). Undoubtedly the proximity of land suitable for cultivation, grazing and construction close to landing places was a key factor in settlement location, though not at the Brough of Birsay (Hunter *et al*, 1993). The thirty settlement sites in the gazetteer all conform to this model, although they represent only a small part of the range of different settlement types and are a fraction of the total number of settlements in the islands in the Viking and Late Norse periods. A combination of sources: literary, archaeological excavation and coastal survey suggest the existence of some 200 settlements. The fifteenth-century rentals list about 500 holdings (allowing for islands in feu and *bordland* (see below) territories where individual farms are not listed; Peterkin, 1820).

Settlements form the largest category in the gazetteer, closely followed by chapels (26 sites). This similarity in numbers is further reflected in the juxtaposition of settlement sites and chapels in 50% of cases in the gazetteer. Settlement sites with an adjacent church had a high status in that they are often associated with known characters from the *Orkneyinga Saga*, such as Westness, Rousay (gaz. no. 27), the Seat of Sigurd; Skaill, Deerness (gaz. no. 039), the home of Thorkel Fosterer; Tuquoy, Westray (gaz. no. 021), the Hall of the Halflidi and The Earl's Bu, Orphir (gaz. mo. 054), the estate of Earl Paul. High status sites consisted of Norse *longhouses*, halls, smithies and (ancillary) rectilinear buildings all drystone built with timber roofs, paved yards and stone-lined drains. There was evidence for weaving, leather and woodworking as well as farming, fishing and domestic activities (Chapter 4). Archaeological finds indicating the wealth and standing of the occupants include gold, silver and bronze jewellery and ornaments and runic inscriptions.

Several excavated settlements had a special status. The farm at Pool, Sanday (gaz. no. 001) may have been a royal administrative or *huseby* farm. The Brough of Birsay (gaz. no. 051) was an earldom residence and the sites excavated over the last couple of decades in the Bay of Birsay (Morris, 1989) (gaz. nos. 049, 056, 059, 060, 093) probably belonged to or at least supplied this estate, and therefore may not be typical of farmsteads of the day. Kirkwall (gaz. no. 136) had special status in being a market town. Little is known of the medieval settlement here other than the Cathedral, St. Ola's Church and remains of an eleventh century waterfront excavated by McGavin (1982). Even less is known about

Pierowall, Westray possibly to be identified with *Höfn* (haven) in the *Orkneyinga Saga* (Pálsson & Edwards; 1978), an important port.

Saga place-names

The *Orkneyinga Saga* refers to the existence of farmsteads and other settlements. Table 3 lists all the places cited in the Saga and their modern equivalents where these are known. In some cases the places refer to actual farms, in other instances to burials or meeting places.

Farm mounds

Farm mounds are artificial mounds, formed through centuries of habitation and its associated accumulation of building remains and refuse. They did not come under the scrutiny of archaeologists until the middle of this century in Norway (Bertelsen, 1979). Farm mounds were first recognised in Orkney by the local archaeologist, Raymond Lamb, during his survey of two of the islands, Sanday and North Ronaldsay (1980). In conjunction with Donald Davidson and Ian Simpson of the University of Strathclyde, Lamb conducted the first archaeological investigation into three mounds on Sanday (Davidson *et al*, 1983).

Lamb believed that this monument type was restricted in its distribution to these two northerly isles, but subsequent survey work has shown then to be more widespread. I have counted over sixty from Lamb's published island surveys (figure 14). There are many more examples on the other islands including the excavated sites at Beachview and Saevar Howe in Birsay Bay, Mainland Orkney. Moreover, the distribution of mounds on Sanday which was published in 1983 does not concur with the original survey report (Lamb, 1980), the most notable omission being the farm mound at Pool, shown by recent excavation to have been occupied from the fourth millennium BC until the thirteenth century AD (Hunter, 1990).

Research in Northern Norway has shown the farm mounds to range in date from the late Iron Age to Post-Medieval period, with a *floruit* in construction around 1600 when the stockfish trade became important and imported pottery, clay pipes and window glass were found in the archaeological assemblages for the first time. (Bertelsen; 1979; Holm-Olsen; 1981; Bertelsen & Lamb; 1993). In Orkney some farm mounds existed before the Viking occupation, although the site at Pool is one of the few where this has been confirmed by excavation. Place-names indicate others eg. How (Old Norse *haugr* meaning a mound) and Tafts (Old Norse *taft* meaning a house site and usually indicating a prehistoric settlement). Radiocarbon dates from three farm mounds in Sanday (Davidson *et al*, 1986) confirms the prehistoric origin of some sites, but at Langskaill (gaz. no. 175) occupation was medieval.

Chapter	*Place-name*	*ON name*	*Description*
8	Hoxa, N. Ronaldsay	Haugaeið	Burial of Thorfinn
9	Stenness, Mainland	Steinnes	Havard staying there
12	Osmundwall, Walls	Asmundarvágr	Baptism of Sigurd
15			Eyvind takes shelter
14	Sandwick, Mainland	Sandvík	Farm of Amundi
16			Banqueting hall
94			Houses on shore
20	Deerness, Mainland	Dýrnes	Thorfinn casts anchor
29	Kirkwall, Mainland	Kirkjuvágr	Residence of Rognvald
30	Papa Westray	Papey	Burial of Rognvald
31	Birsay, Mainland	Byrgisherað	Earl's residence
33	Westness, Rousay	Vestrnes	Sigurd's Farm
65			Paul there
47	Egilsay	Egilsey	Meeting Hakon & Magnus
55	Orphir, Mainland	Ǫrfjara	Harald's estate
66			Paul's estate
56	Tankerness, Mainland	Tannskaranes	Erling's farm
56	Gairsay	Gáreksey	Hrolfsson's farm
65			Estate of Asleifson
56	North Ronaldsay	Rínansey	Farm of Ragna
56	Rapness, Westray	Hreppines	Farm of Kugi
56	Westray	Vestrey	Hamlet of Helgi
65			Farm of Gunni
			Farm of Thorkel Flayer
56	Swona	Svíney	Farm - poor
56	Sebay, St. Andrews	Flydrunes	Farm of Thorstein
56	Knarston, Mainland	Knarrarstaðir	Farm of Jaddvor
56	Upland, Hoy	Uppland	Farm of Jon Wing
56	Whitehall, Stronsay	Brekkur	Farm of Richard Wing
56	Glaitness, Mainland	Glettunes	Farm of Grimbel
57	Kirkwall	Kirkjuvágr	Market town
66	Stronsay	Strjónsey	Farm of Valthjof

Table 2 *Saga Places*

Chapter	*Place-name*	*ON name*	*Description*
66	Sanday	Sandey	Estate of Magnus
66	Knarston, Scapa	Knarrarstaðir	Farm of Arnkel
66	Damsay	Daminsey	Stronghold of Blann
66	Papa Westray	Papey	Farm of Ragna
71	Pierowall, Westray	Höfn	Farm, village & church
76	Gaitnip, Mainland	Geitaberg	Farm of Borgar
76	Scapa, Mainland	Skálpeið	Landing place
84	Wyre	Vigr	Farm of Kolbein Heap; Stronghold
91	Huip Ness, Stronsay	Hofsnes	
93	Graemsay	Grímsey	Anchorage
93	Hamnavoe, Mainland	Hafnarvágr	Stromness harbour
94	Widewall Bay	Víðvágr	Landing place
94	South Walls	Vagaland	Landing place
94	Damsay	Daminsey	Drinking hall
95	Voluness, Sanday	Voluness	Farm
97	Stroma	Straumey	Settlements there
97	Eynhallow	Eyin Helga	
92	Cairston, Mainland	Kjarrekstaðir	Anchorage
93	Maeshowe, Mainland	Orkahaugr	Shelter
88	Evie Sound	Efjusund	
9	Havard's Field	Hávarðsteigar	
95	Hellis Isle	Hellisey	
14		Hlaupandanes	
56	Hoy	Haey	
5	Mainland	Hrossey	
65	Mull Head, Mainland	Muli	
55	Rackwick	Rekavik	Farm of Thorljot
95	Rendall	Rennudalr	Farm
26	Roberry, Walls	Raudabjörg	Headland
8	S. Ronaldsay	Rögnvaldsey	
56	Rousay	Hrólfsey	
92		Skeggbjarnarstead	Farm
66	Stronsay Firth	Vestfjörðr	
95	Tingwall	þingvöllr	Farm of Helgi

Table 3 *Saga Places*

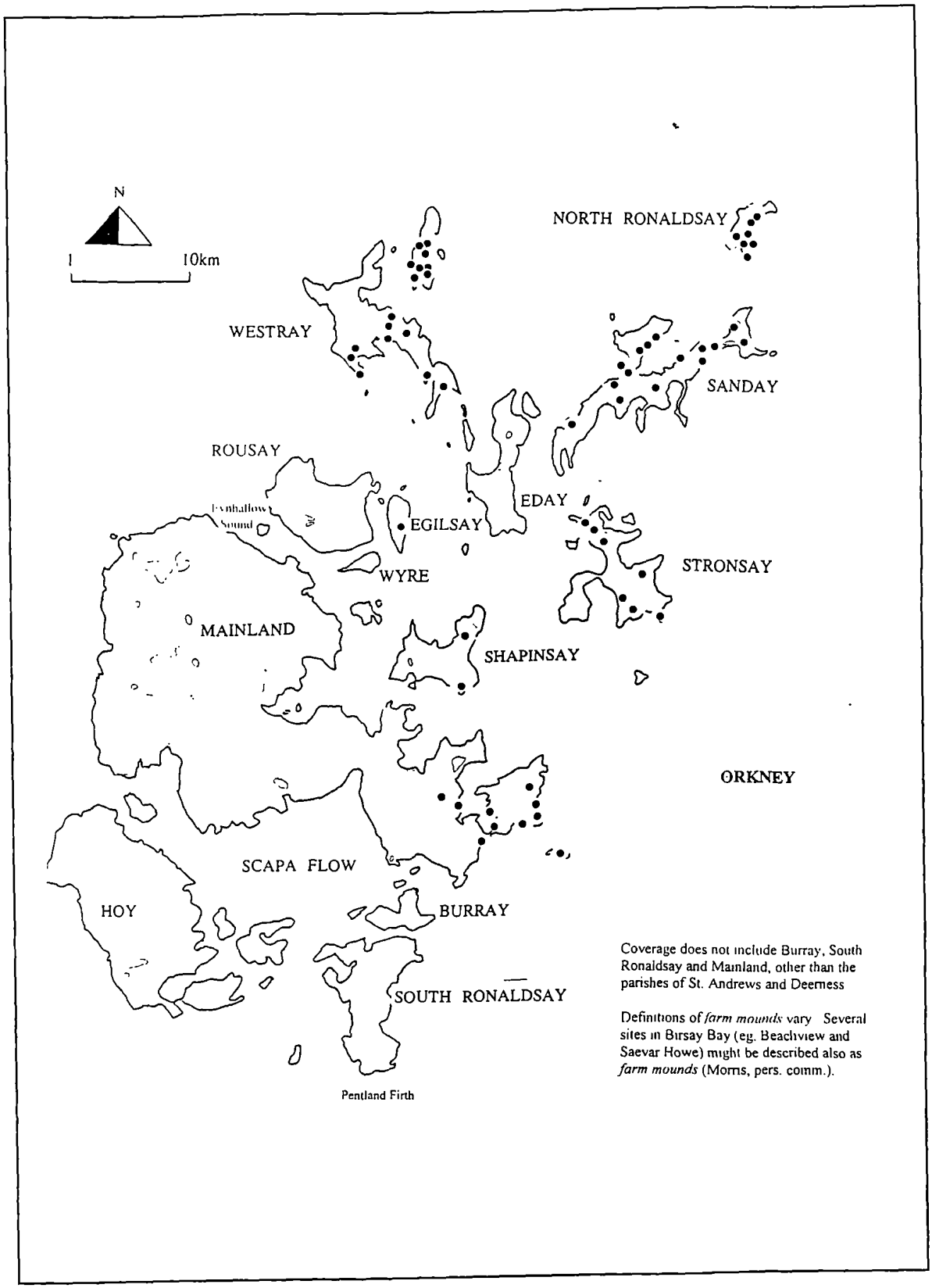


Figure 14 The distribution of farm-mounds in Orkney

Occupation of farm mounds was therefore by no means restricted to the medieval period. Some may have been abandonned before or established after this time. Elsewhere, as at Pool, there may have been settlement continuity in some form, perhaps involving a slight shift in focus, and this may be the case at Northskaill and Langskaill, Sanday where there are two mounds immediately adjacent. Such a shifting settlement pattern is, of course, well attested in the Iron Age *terp* sites of the Low Countries (Todd,1987).

The farm mounds vary in size up to about 5000m² with deposits up to five metres deep. The stratigraphy of these sites is, not surprisingly, complex. The three mounds which were test-pitted in Sanday all had quite different sequences. In Norway no more than 1% of any one site has been excavated. Clearly the interpretation of large sites from such small trenches is problematic. It is also interesting to note that their distribution in Norway, as in Orkney, is coastal (Bertelsen, 1984).

Finding settlements

The location of many settlement sites has been revealed through coastal erosion undermining middens and structures. Examples include The Bay of Skaill, Sandwick (gaz. no. 153); Saviskaill, Rousay (gaz. no. 147); Strömness, North Ronaldsay (gaz. no. 007); Skaill, Egilsay (gaz. no. 033); Quoys, Deerness (gaz. no. 038); Cross Kirk, Sanday (gaz. no. 014); Lower Dishes, Stronsay (gaz. no. 105) and King's Craig, Papa Westray (gaz. no. 016). At the Bu of Hoy (gaz. no. 150) settlement traces are visible in the stream bank adjacent to the church. Earthwork remains at Gallow Hill, Sanday (gaz. no. 013); Sandside, Deerness (gaz. no. 141); The Bay of Kirbist, Westray (gaz. no. 154) and Howe Geo, Deerness (gaz. no. 160) are equally difficult to interpret without excavation.

Crawford (pers. comm.) argues that as all place-names on Orkney can be ascribed a pre-seventeenth-century date, every farm in Orkney occupies the site of a medieval predecessor. In fact, a comparison of the holdings listed in the rentals from the very end of the medieval period with the distribution of modern farms, shows clearly that although the same range of farm names is employed, many farms have been only recently established. Thomson (1987, 26) cited the example of *-quoy* names still being given to new farms in the nineteenth century. There must, nevertheless, have been many more farms and settlements than those for which there is archaeological evidence today.

Lowe (1987, 287) among others has commented upon the frequent occurrence of medieval chapels close to brochs. The reason for this juxtaposition was originally thought to be practical, namely the availability of suitable building material. But the occupation of many brochs has now been shown to continue into the eighth century and beyond (eg. Broch of Burrrian, North Ronaldsay and the Broch of Gurness, Evie) making the monuments more

nearly contemporary. At Skaill, Deerness and the Broch of Burrian, North Ronaldsay Christian artefacts were discovered. Medieval chapels might have fallen under the secular patronage of local leaders based at brochs or other neighbouring settlements (Lowe, *op cit*).

Chapel assoc.	*Broch assoc.*	*Broch & chapel assoc.*
Tuquoy(W)	Dane's Pier(St)	Strömness(NR)
Rapness(W)	Nes of Brough(S)	Lopness(S)
Clestrain(St)	Tresness(S)	Quoys(D)
Greenie Bray(S)	Osmundwall(SW)	Brough of Birsay(B)
Colliness(S)	Dingieshowe(St.A)	Lyking(Sk)
Westness(R)	Bu of Burray	Howe(Str)
Cobbie Roo's(Wy)	Skaill(Sk)	Oxtro Broch(B)
Lambaness(S)	Broch of Burgar(E)	King's Craig(PW)
Earl's Bu(O)	Tingwall(E)	St. Tredwell's(PW)
Kirkwall(K)	Hillock of Weland(Sh)	

W - Westray; St - Stronsay; NR - North Ronaldsay; S - Sanday; D - Deerness; SW - South Walls; B - Birsay; StA - St. Andrews; Sk - Sandwick; R - Rousay; Str - Stromness; Wy - Wyre; PW - Papa Westray; O - Orphir; E - Evie; K - Kirkwall; Sh - Shapinsay

Table 3 *Gazetteer sites with broch and chapel associations*

Lowe (*op cit*) cited 44 cases where brochs and chapels were juxtaposed. About one third of the gazetteer sites conform to this pattern (Table 3). Using this model the identification of chapel sites is a means of locating Viking and Late Norse settlement sites (Table 4). In 1993 the author visited ten gazetteer locations where there were both medieval chapels and Iron Age brochs. At six of these sites there were visible settlement remains, possibly of Late Norse / medieval origin (Table 5).

Broch & chapel assoc.	*Chapel assoc.*	*Broch assoc.*
Bay of Kirbist(W)	Halcro(SR)	Dennis Ness(NR)
Hunton, Stronsay	Skaill, Eday	Grobust, Westray
Brim's, S. Walls	Windwick(SR)	Green Hill(St)
Hoxa(SR)	St. Peter's Bay(StA)	Quoyness, Hoy
Sandwick(SR)	Damsay	Hurnip's Point(D)
Backaquoy, Firth	Bressigarth(S)	Compston(StA)
North Aittit, Rendall	Holm of Aikerness(W)	Ingashowe, Firth
Knarston, Rousay	Skelwick, Westray	Langskaill(StA)
Peterkirk, Sanday	Cleat, Westray	Woodwick, Evie
Backaskaill Bay(S)		Stenso, Evie
Newark, Sanday		Clumly, Sandwick
		Borwick, Sandwick
		North Sand(R)
		Varmady, Rousay
		Tratland, Rousay
		Bay of Moclett(PW)

Table 4 *Places with broch and chapel associations where there might be Medieval settlement (based on Lowe, 1987)*

Site	***Remains identified in survey***
Hunton, Stronsay	Possible settlement remains at Brue.
Bay of Kirbist, Westray	Possible Norse site adjacent to the broch, previously interpreted as a prehistoric house and field system.
Sandwick, S. Ronaldsay	Earthworks were located in two places
Hoxa, S. Ronaldsay	No proven settlement remains found.
Brims' Hoy	No proven settlement remains found.
North Aittit, Rendall	No proven settlement remains found.
Backaquoy, Firth	No proven settlement remains found.
Peterkirk, Sanday	Known sites may have Medieval occupation.
Newark, Sanday	Midden and structures located.
Backaskaill Bay, Sanday	Midden and structures located.
Knarston, Rousay	Earthworks of unknown date.

Table 5 *Sites with a broch and chapel associaton which were investigated in the field*

This hypothesis of site location cannot be proven without dating the remains located by my fieldwork. Where there is midden visible in the cliff section samples might be taken for radiocarbon dating. In the absence of any diagnostic morphology of the earthwork sites dating would have to rely upon coring and dating of sediments.

Based upon the evidence of excavated sites the settlements located by this model are most likely to be of high or special status so the problem of finding the everyday working farms and farmsteads remains. We might begin to tackle this problem by conducting excavations beneath known *pennylands* or household units which are mentioned in the fifteenth century rentals. The rentals record three types of tax (*skat*): butter *skat*, malt *skat* and *forcop*. These were charged according to the number of newborn calves and the extent of a household's cultivated land (Thomson, 1987). If one assumes that increased productivity was directly related to the increased size and status of a farmstead then those households with average *skat* values in the rentals should represent typical settlements.

Sites accorded special status in the literary record: bordland, thing and huseby

Three administrative categories of site are known exclusively from literary and legal sources: *bordland*, *thing* and *huseby*. There is little evidence of their likely archaeological correlates.

Bordland territories

Bordland, Earldom properties which were exempt from tax dues, were essentially administrative territories which have left little physical trace. Their existence is noted in the 15th and 16th century rentals of Orkney where they are described as "auld erledome bordland" (Peterkin, 1820). Johnston (1902) first compiled a list of these earldom properties from the rentals. For example the rental of the parish of Walls (gaz. no. 173), compiled in 1503 says the whole area once belonged to the king's earl, except holdings which were purchased from Earl William. Similarly in Hoy there is record of the Earl giving away land:

> beneth the hill wes ane uris terre of the quhilk the first erle Henrie gaif to the vicar iij d terre for the uphald of ane mess in hoy a day ilk oulk for evir And sa remaneis to the King in Werbuster beneth the hill ix d terre ant xiv m t iij licti.

The place name *Bu* or *Bull* (a Scottish rendering) occurs in areas which were bordland: The Bu of Orphair (Òrphir, 1503; gaz. no. 117), the Bu (Hoy, 1503; gaz. no. 116), The Bu of

Karstane (Stromness, 1503; gaz. no. 172) and possibly Lebow (Burray, 1502; gaz. no. 114). The word derives from the Old Norse *bu* which means farm, but which may have had a specific technical meaning in Orkney, indicating a leading farm or an Earl's residence. The term is not used in the *Orkneyinga Saga*.

The *Orkneyinga Saga* described a Norse hall, belonging to the earl's estate at Örfjara. The site is now associated with the excavated Viking period settlement known as "the Earl's Bu" in Orphir (gaz. no. 054). The close proximity of the Round Church, a type of chapel unique in Orkney but paralleled in Southern Scandinavia and on the Continent (Fisher, 1993), puts the special status of this site beyond doubt. The Bu of Karstane encompassed the fortified site the Bu of Cairston (gaz. no. 149) and it is likely that similar important settlements might be found at the other *Bu* sites. One *Bu* site appears in the rentals (The Bu of Skaile, Paplay and Grenewall, 1502) which is not described as earldom land and many bordland territories do not contain a *Bu* so the relationship between the two is unclear. Undoubtedly the bordland territories encompassed both farms of the earl's men or *goedingar* and of *bonder*, other landowners.

Thing

Thomson (1987) suggests that the *thing* (Old Norse *þing* meaning assembly) played a much less significant role in administration in Orkney than it did say in Iceland or Shetland, since disputes might be put before the Earl for arbitration, rather than to a general assembly. Historically, Orkney was divided into two, and sometimes three parts, depending on the number of earls in rule. Thomson, among others has attempted to reconstruct these earldom territories, each of which might be expected to have a *thing* site.

The place-name record provides three candidates: Tingwall, Evie (gaz. no. 088); Dingieshowe, Deerness (gaz. no. 037) and Jupiter Fring, Rousay (gaz. no. 092). The identification of the last of these is probably mistaken, the interpretation being an attempt to understand the site's name, rather than a genuine tradition of a *thing-stead* (Lamb, RG, 1982). The inland location of this site on Rousay is also anomalous since it falls within the jurisdictional territory of Tingwall. It seems reasonable to conjecture, however, that there is a third *thing* site, as yet undiscovered, somewhere in the northern isles.

Neither of the two attested *thing* sites has been excavated so we do not know what structures, if any such sites contain.

Huseby

The place-name *Huseby* (Old Norse *Husabyr*; *Husaboer*) is thought to be a technical term for a royal administrative farm which originated in Uppland, Sweden before the mid seventh

century (Steinnes, 1959). There are five such names in Orkney. The only related excavated site is the farm at Pool, Sanday (Hunter *et al*, 1993; gaz. no. 001) which lies close to a field named *Houshay*. In the absence of more excavated sites it is impossible to determine the significance of the place-name.

Coastal defensive sites

This covers a range of seventeen sites: three *kastali* recorded in the *Orkneyinga Saga* on Rousay, Damsay and Stromness, mainland, and other apparently defensive constructions (Morris, 1985; Cruden, 1960; Talbot, 1974). The King's Castle, Kirkwall (gaz. no. 171) was built by Earl Henry Sinclair in 1380 and it survived until 1614. The upstanding remains were destroyed in 1865, but a well still remains beneath Castle Street in the town centre. Earl Henry had the castle built on the site of the old hall of the Norse Earls. Unfortunately no description of the earlier structure exists. Henry's castle is described as having thick stone-built walls.

Scuthi Head (005) in morphology is quite different from most other sites. Its date is unknown, but in form it resembles so-called Iron Age promontory forts (Lamb, 1980). One theory of Viking settlement, based on the use of the terms *nesnam* and *landnam* in the sagas, interprets this as early settlers occupying and fortifying headland sites as a means of infiltration, for example, the *Orkneyinga Saga*, chapter 82:

> Svein gathered his forces and went over to Lambaborg, ready to take a stand. It was a safe stronghold and they stayed there, sixty strong, fetching in all the provisions and other things they needed. The fortress stood on a sea-cliff with a stoutly built wall to landward. The cliff stretched quite a distance along the coast. They committed many a robbery in Caithness, taking the loot into their stronghold, and so became thoroughly unpopular.

In this example Svein and his men may have been reusing an earlier fort but, nevertheless, this serves as an example that medieval occupation of promontory forts should not be rejected where a site has not been excavated. There are tens of these promontory forts along the coast and on the shores of lochs in Orkney. Lamb (1973; 1980) rejects this theory of Viking promontory forts and also rejects the existence of one such medieval castle, sometimes called Clouston Castle at Gernaness, Stenness (gaz. no. 100). Here a ditch cuts off a peninsula on which is situated a complex series of foundations of a courtyard,

surrounded by a curtain wall and containing two buildings, one a hall and the other a bathroom. The only recorded finds, a single sherd of "broch" pottery, hammerstones and animal bones do not assist in dating its occupation. The published plan (Clouston, 1926, 284) is certainly fanciful, but Clouston did recognise a figure of eight structure before any parallel for such a building was known. The site today is entirely overgrown, and certainly warrants re-evaluation.

Cubbie Roo's Castle on Wyre (gaz. no. 035) comprises a small stone tower encircled by a double bank and ditch. It dates from the 12th century, although at least four subsequent building phases have been identified. The site demonstrates the use of ramparts in Medieval castle construction. The construction of the castle is recorded in the *Orkneyinga Saga* (chapter 84):

> At that time there was a very able man called Kolbein Heap farming on Wyre in Orkney. He had a fine stone fort built there, a really solid stronghold.

It was used into the 15th century. According to the *Orkneyinga Saga* Damsay (gaz. no. 091) also had a stronghold, but this has not been located.

The Wirk, Rousay (gaz. no. 032) is a similar simple square tower with walls up to 2.2m thick. The tower is attached to a rectangular structure to the east. The original structure may date to the 10th century. The name is derived from the Old Norse *virki* meaning a fortification. The Work, Kirkwall may have the same name derivation, although the archaeological remains visible here have been interpreted as a chambered cairn (RCAHMS, 1946, no. 414). The site lies on top of a ridge with some walling exposed at the landward end and evidence of a drystone structure on the summit.

There is a fortified tower at Stenness Kirk (gaz. no. 156), although here the tower seems to have been semi-circular on a rectangular base. The square tower at Castle Howe, Holm (gaz. no. 073) is reminiscent of these sites. Excavations at Tuquoy, Westray (Owen, 1993; gaz. no. 27) have partially revealed structures with exceptionally thick walls. Rather than being defensive, Owen suggested that the extravagant construction was an expression of the wealth and status of the owner.

Several sites are identified as castles simply by local tradition, tenuous grounds for identification perhaps, but evidence which should not be underestimated where such a tradition is genuinely ancient. But the unwary researcher should be warned for there was a great rediscovery of Scandinavian ancestry in the nineteenth century in Orkney when virtually every bump in the ground was given status as a Medieval monument. At Marwick (gaz. no. 155) there is a mound. At Stackel Brae, Eday (gaz. no. 041) there is a large

coastal mound with dry stone masonry and some mortar bonded and one clay-bonded wall visible among eroding kitchen midden. At the Bu of Cairston, Stromness (gaz. no. 149) clay bonded rubble walls formed a square courtyard construction enclosing two rooms built into the north and west sides. Occupation here is not closely datable. The site is known locally as "The Castle". A similar tradition surrounds the identification of a heap of stones on a slight elevation at Ellibister, Rendall (gaz. no. 107) and a knoll with stonework and midden debris at Sealskerry Bay, Eday (gaz. no. 108) and nothing remains at the site known as the Castle of Snusgar gaz. no. 138) although ruins were apparently visible until 1795.

Industrial sites

This category might logically cover a range of site types - iron production sites, water mills and salt pans. There are only four industrial sites in the gazetteer, three iron production sites: on Sanday (gaz. no 82), at the Bay of Creekland, Hoy (gaz. no. 151) and at Lavacroon, Orphir (gaz. no. 081) and a water-mill at the neighbouring Earl's Bu (gaz. no. 099).

Iron production

There is only one source of iron ore in Orkney, on Hoy, at the Bay of Creekland (gaz. no. 151) where it is visible in the sea cliffs and where it was mined by the Carron Company in 1765-8 (Wilson, 1935, 152). The old workings lie in the field above the cliff in which the vein is exposed and fragments of haematite can be found on the beach. I have no doubt that this source would be exploited in the Viking and Late Norse periods and it is surely only a matter of time before the extraction site and furnace(s) are located through fieldwork. If, however, the ore was extracted from the cliff face little trace of the activity would now remain.

The site at Lavacroon, Orphir (gaz. no. 081) is a mound 30m by 26m and 1m high. Fieldwalking and geophysical survey have produced stonework, a Norse ingot mould, nails and rivets and 16kg of iron slag. There were evidently two buildings, one circular and the other rectilinear (Batey, 1986; Johnson, 1990). The buildings are undated so the relationship between the structures and the finds is unclear. It is possible that this was a production site. Certainly iron production was a crucial part of the Viking and Late Norse economy in providing the material necessary for tools, weapons and especially boat nails and rivets. Several settlements in Orkney had smithies, but as yet no production sites.

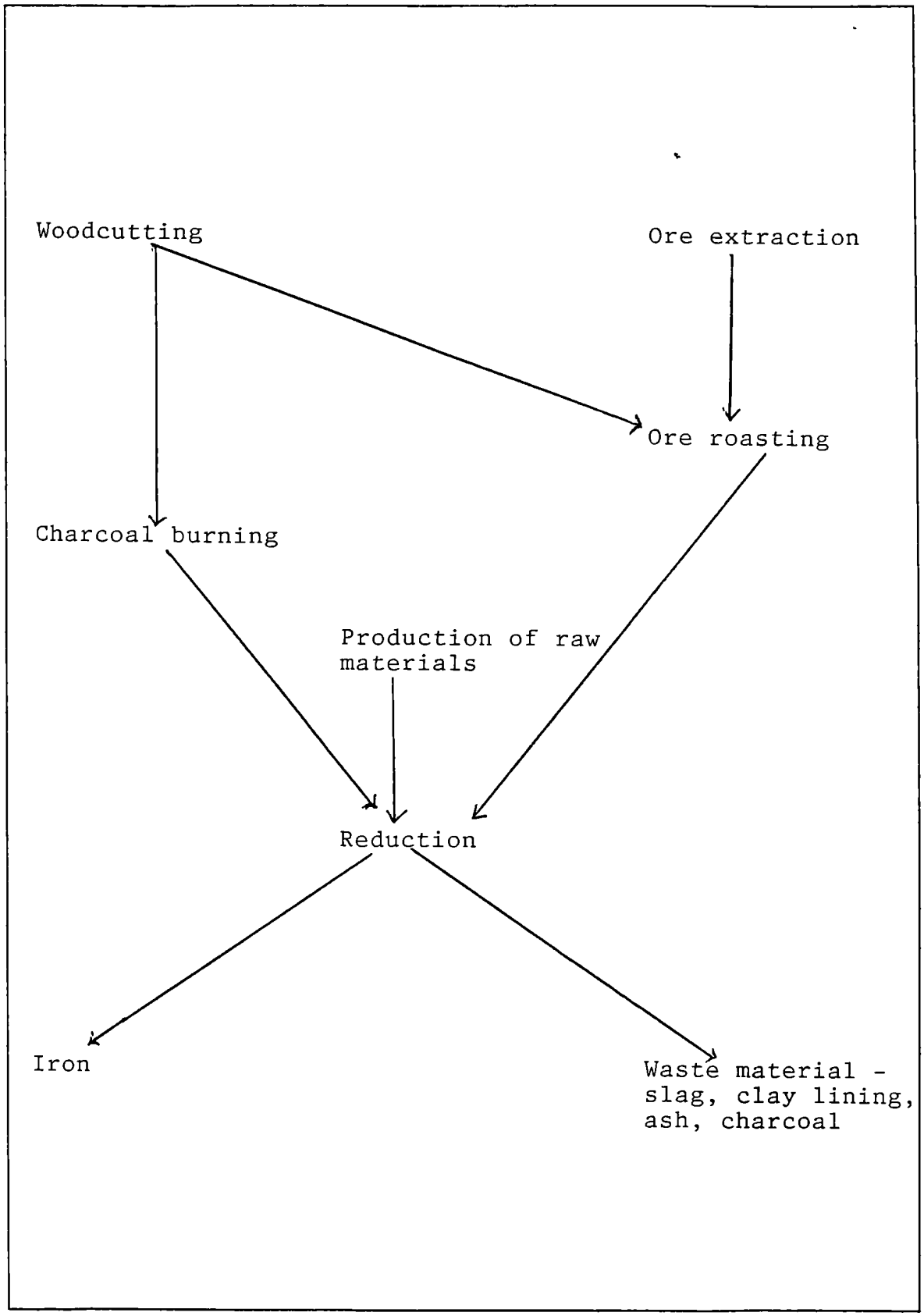
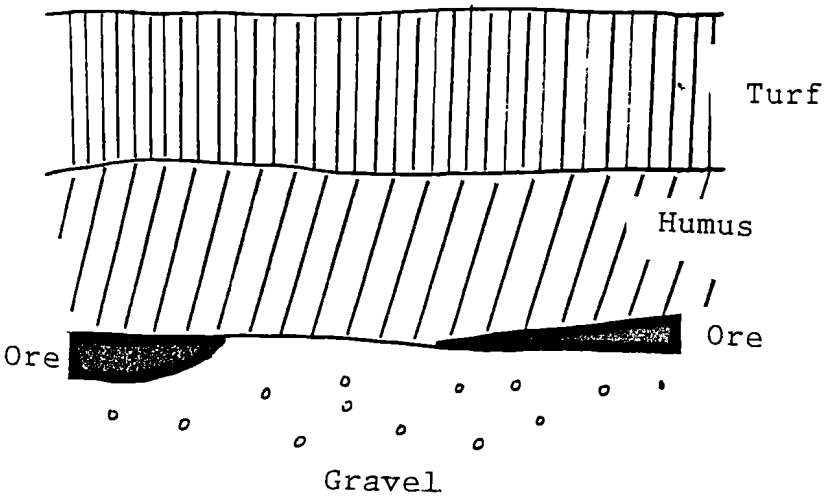


Figure 15 The main components of iron production (after Johansen, 1973)



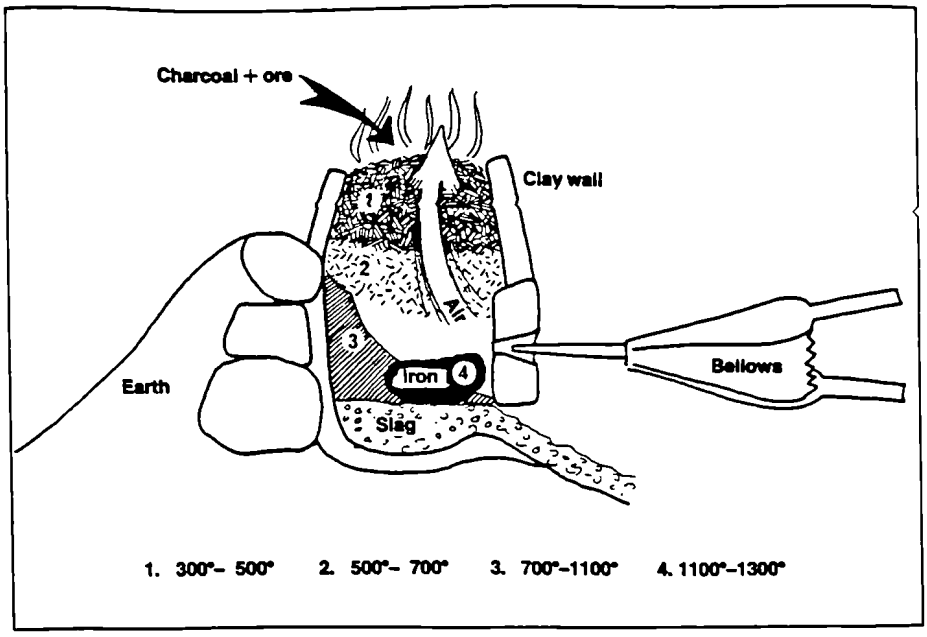


Figure 16 A section through a bog containing iron ore (after Johansen, 1973) and the production of iron from bog ore in a smelting furnace (after Magnusson, 1992)

Elsewhere in Orkney people would have mined bog iron, as was the practice in Sweden and Norway. Bog iron precipitates in bogs where there are iron-rich rocks. The lacustrine area of western Mainland where iron values above background (>8%) are recorded over the Stromness Flags and the Rousay Flags series (Institute of Geological Sciences, 1978) would be one area worthy of exploitation.

Figure 9 shows the main components in iron production based on domestic iron production (*jernvinne*) in eighteenth century Norway. Here wood was used in ore-roasting and charcoal in the actual reduction. Today Hoy has the only established woodland in the isles. This was formerly more extensive. Perhaps one of the causes of its reduction was the use of wood in iron production, though it is now considered unlikely that charcoal production necessarily implies widespread deforestation (Peter Crewe, pers. comm.). It is just possible that peat or a combination of peat and charcoal was used as fuel, provided that a sufficiently high temperature could be achieved and that the structure of the burnt peat allowed an adequate supply of oxygen. There are 18th and 19th century patents for the smelting of iron using peat in blast furnaces, but there is no evidence for its successful use and no-one has yet experimented with producing iron by this method in smelting furnaces of the type used in the medieval period (Peter Crewe, pers. comm.). That said unless large quantities of peat ash were recovered from sites it would be difficult archaeologically to prove its use.

In Scandinavia until the twelfth century iron production utilised smelting furnaces (figure 16), initially close to permanent settlements and later as separate permanent production sites in the mountain valleys, close to the fuel source. At the end of the twelfth century the blast furnace was introduced. This innovation made the mass production of iron possible (Magnusson, 1992).

The current paucity of iron production sites in Orkney tends to suggest that production was small scale, probably using simple smelting furnaces which supplied individual farms or neighbouring settlements. It is generally assumed that iron was imported as finished articles, but it may be that a small scale indigenous production was practised seasonally when long distance trade routes were closed. Obviously, this model may require revision in the light of further evidence.

One site which matches the description of a smelting furnace was recorded by the Royal Commission (1946, no. 165). Its location described then as "at the head of a fresh water loch about 1 mile from the sea" on Sanday cannot now be determined. The site was investigated and described in 1824 by a local antiquarian, Dr. Wood, as consisting of a "burnt" mound of ash, stones and earth, 26 metres in diameter and 1.8 metres high,

overlying a clay-bonded structure, 3.6 metres square with a hearth at one end, a small cell to the right and a drain running from the hearth towards the loch.

Water-mills

Few Medieval water mills are known from Scandinavia. Batey (1992a) mentions a timber example from Omgård, Denmark (Nielsen, 1987) and examples are known from Ireland (Baillie, 1980). The stone-built horizontal mill at Earl's Bu, Orphir (gaz. no. 099) is therefore important being firmly dated by overlying midden deposits to before the eleventh or twelfth centuries. Doubtless further mills existed in Orkney close to other important settlements. The type of horizontal mill found at Orphir and known as "Norse mills" continued in use into the early modern period.

Salt industry

Salt was important in ancient times for preserving food, but in Orkney fish and other meat could be more simply cured in the salt laden winds in drying sheds (figure 17). Salt is an obvious natural resource, so obvious that its exploitation has generally been overlooked. Even if there was little local demand for the product, it might well have been produced for export. Salt production sites are known in Britain from the Iron Age and by the medieval period it had become a specialised industry (De Brisay & Evans, 1975). The *Domesday Book* records 17 active salterns in Lindsey, Lincolnshire alone in 1086.

The evaporation of sea water and the crystallisation of brine by gentle heat would require such constructions as evaporation tanks, working floors and hearths, ditches and gullies and the associated briquetage of evaporating vessels, salt cake moulds and salt panning waste. The remains of salt works in Orkney are hinted at in certain place-names (Salt Pan, Orphir and Saltess, Sanday).

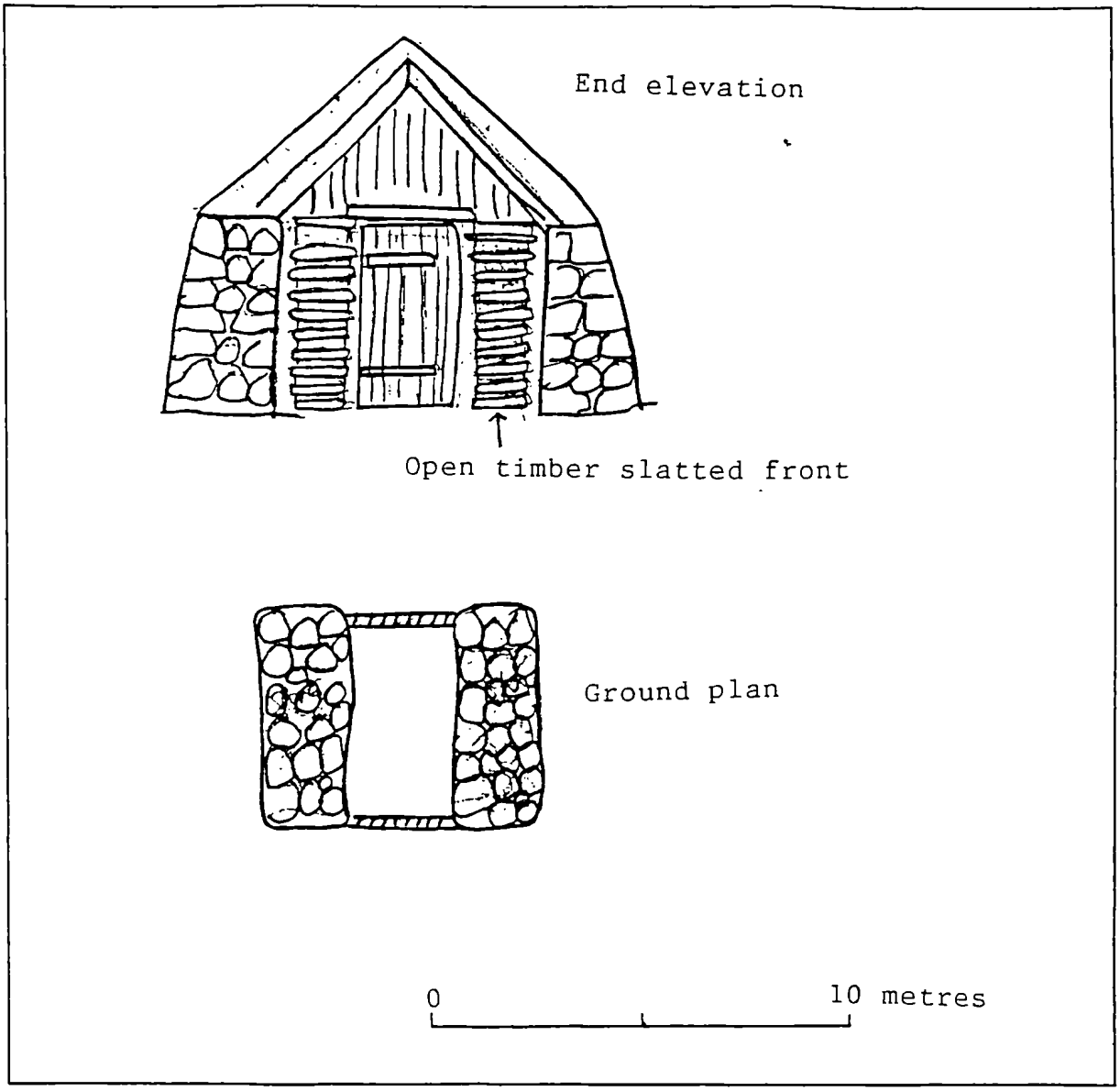


Figure 17 An Icelandic fish-drying shed or *skyo* (after Lamb, 1973)

2.1.4 Ecclesiastical sites, burials and cemeteries

The Scandinavian settlers of the ninth century were not Christian, though it is generally accepted that Christianity was first introduced into Orkney c. AD 600 (Cant, 1982). The traditional date of the conversion is AD 995 when Earl Sigurd of Orkney was forced to convert by Olaf Tryggvason, the King of Norway (*Orkneyinga Saga*, chapter 12).

The first recorded church building was in the eleventh century when Earl Thorfinn commissioned Christchurch at Birsay (gaz. no. 135). The Round Church at Orphir (gaz. no. 055) was built in 1090 and the foundations were laid for St. Magnus' Cathedral (gaz. no. 057) in 1137. These examples, all dated by their occurrence in the *Orkneyinga Saga*, along with St. Magnus' church on Egilsay (gaz. no. 043), are unusual in their construction and do not therefore help in dating other chapel sites.

District *urisland* chapels were established in the eleventh century. These may have been private chapels, built by prominent people since their distribution is related both to the rental districts (urislands) and also to high status settlements such as Cross Kirk, Tuquoy (gaz. no. 025) and Deerness Church at Skaill (gaz. no. 094). The Earl, or some other secular authority probably introduced the scheme (Cant, 1982). A parochial system probably replaced this one in the late twelfth or early thirteenth centuries, although there is no historical record of this (Lowe, 1987, 36). Some of the former urisland chapels then became redundant whilst others became the head churches of parishes. Lowe's thesis on ecclesiastical sites in the Northern Isles and Man (1987) deals with pre-parochial chapels. He says that there are 170 such early chapel sites, although he provides no corpus of sites. The form and dimensions are provided for 39 of these sites. He identifies four forms: unicameral (gaz. nos. 089, 139, 161, 165, 166, 167, 170), bicameral (gaz. nos. 026, 044, 083, 084, 090), multicameral (gaz. nos. 043, 094, 157) and circular (gaz. no. 055). Some sites change through time and therefore span more than one category. St. Magnus' Birsay (gaz. no. 135) began life as an unicameral building, then became bicameral and was then replaced by a cruciform building.

Assigning dates to chapel sites is problematic. Few have been excavated and dating purely by structural typology is unreliable. Some are dated by associated finds, such as the hogback stone at St. Boniface's Church, Papa Westray (figure 18; gaz. no. 18). The chapel at Newark, Deerness (gaz. no. 095) was dated by the discovery of a tenth century coin in the floor layers. Similarly, an Anglo-Saxon penny of Eadgar provides a *terminus ante quem* and a *terminus post quem* for the construction of the two phase chapel on the Brough of Deerness (gaz. no. 144), built in timber and stone respectively. These sites illustrate that the sequence of foundation and use of chapels is more complex than that which I have just outlined.

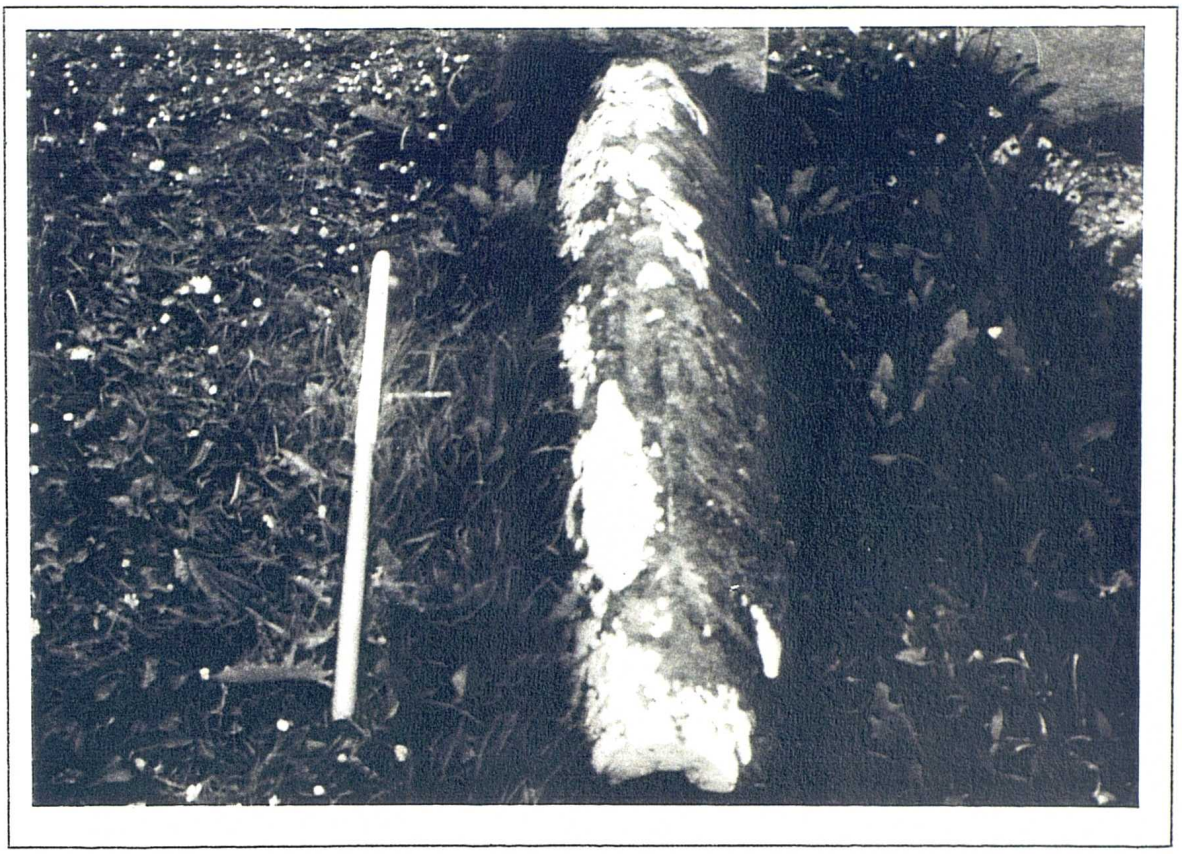


Figure 18 The hogback stone from St. Boniface's Church, Papa Westray (Photo: Author)

Lamb (1973 & 1976) has argued for the existence of a Norse monastic tradition. Those monastic sites which have longhouses belong to the twelfth and thirteenth centuries (gaz. nos. 040, 034, 052), those with oblong structures may date anywhere from the eighth to the eleventh centuries (gaz. nos. 134, 162, 163). Other structural forms are as yet undatable (gaz. nos. 109, 098). Lamb suggested that many of these monastic sites were paired with one a parent monastery and the other a dependent hermitage. This theory is based on their location and accessibilty. There is little archaeological evidence to support his theory since few of the sites have been excavated and no pair of sites has been excavated. Lamb's dating of the sites to the Late Norse period solely on the basis of their form is contentious but given the isolated nature of the sites and the pattern in their distribution his theory is plausible.

Burials and cemeteries

Only three burials have been dated by radio-carbon assay to the Medieval period: a single skeleton at Sandside, Graemsay (gaz. no. 061) and two skeletons at Red Craig, Birsay Bay (gaz. no. 056). Radiocarbon dates for the cemetery at Westness, Rousay have not yet been

published. Such is the paucity of the record that only about 160 people can be shown to have died between AD 800 and 1500. About 55 of these were unaccompanied burials and are dated by stratigraphical association: Saevar Howe (gaz. no. 058), Newark (gaz. no. 096), Brough of Birsay (gaz. no. 053), Warebeth (gaz. no. 080), Brough of Deerness (gaz. no. 145), Old Manse (gaz. no. 179), Skaill (gaz. no. 180). The remainder are distinctive Viking burials, accompanied by weapons or other characteristically Norse artefacts. The dating of such graves is problematic since heirlooms were sometimes buried as in a grave excavated at Buckquoy (gaz. no. 049) which contained an Anglo-Saxon penny of Eadmund minted in the second half of the tenth century, excluding the other grave goods which suggested an earlier date for the burial (Crawford, 1987, 121). Similarly a brooch found in a female grave at Westness, Rousay (gaz. no. 031) was already about one hundred years old when it was buried (Stevenson, 1986).

In the gazetteer I separate individual burials and cemeteries. Future fieldwork may show that some of these single burials belong to larger cemeteries. A few infant and child burials are known from the Brough of Deerness (gaz. no. 145) and Moaness cemetery (gaz. no. 028) on Rousay. The latter site is very important, it is the only scientifically excavated cemetery site of this period in Orkney. Unfortunately, over ten years on from the last season of excavation there is still no final publication. The form of the graves varies within the same cemetery - there are cist graves, flat graves and boat burials, but surprisingly no burial mounds and no cremations. A similar range of burials is found in Caithness (Batey, 1993).

Both cremation and inhumation was practised in this period in Norway, at Lille Guldkronen and Kaupang, Vestfold (Blindheim *et al,* 1981). Sometimes a stone ship setting was erected over the grave, but no such funerary monument is known in Orkney. Two instances of cremation are known of in northern England at this time; one at Ingleby in Derbyshire and the other at Hesket-in-the-Forest, near Carlisle, the former within the Danelaw, but the latter in an area colonised by Norwegian Vikings. The cremation at Hesket-in-the-Forest had parallels to cremations in Nordfjord, Norway. It contained burnt grave goods, not *in situ*, beneath a cairn. The cremation at Ingleby was much like examples found in Denmark. It may be that these monuments have simply not been recognised in Orkney.

2.2 The maritime cultural landscape in its historical context c. AD 800 - 1500.

The purpose of this section is to summarise and compare the archaeological and written evidence for the Viking settlement of Orkney and the subsequent period of Norse rule. Written sources provide the historical context of the Orkney Earldom from c. AD 800 to 1500. The main written sources are the *Orkneyinga Saga* and the first rental of Orkney, written between 1497 and 1503 (Peterkin, 1820).

During the six centuries of Norse rule in Orkney there were many changes: in the economic and subsistence base, the form and distribution of settlements, mechanisms of trade and exchange, religion, the range of external contacts, technology and the social and administrative structure. The viking settlement was underway and an earldom residence established in Birsay by the ninth century (Morris, 1985, 213). At the end of the tenth century Christianity was officially adopted and a programme of church building followed. An episcopal seat was established at Birsay, but this moved to Kirkwall when the Earl's residence transferred there at the turn of the eleventh century. The construction of St. Magnus Cathedral began c. 1137. The following two centuries saw increased Scottish influence in the islands. Earls were of Scottish rather than Norwegian descent, and Norway, the sovereign of Orkney ceded power to Denmark. In 1468/9 the King of Denmark pawned Orkney and Shetland to Scotland as part of the dowry of his daughter, Princess Margarethe, in her marriage to James III of Scotland. This event marks the end of Scanmdinavian rule in the islands.

This historical framework often sits uneasily with the material evidence. Certain changes in the archaeological record appear to coincide with historical events, but whether the historical record can be or should be used to explain the archaeology and vice versa, is a subject for debate (see 1.1). Nevertheless, the framework requires diuscussion here since implicitly or otherwise it provides a context for the archaeological evidence presented in this thesis.

Written records place the settlement of Orkney by Vikings some time during the ninth century. At this time new building and artefact styles appear in the archaeological record. In particular a wide range of grave goods, of Scandinavian design, were buried in graves and longhouses and sub-rectangular structures appeared alonside, or in some cases relaced the round houses and figure-of-eight shaped buildings which typified the Pictish period. Flax cultivation seems also to have been introduced into the islands in the ninth century (Hunter *et al*, 1993), though this need not imply that the Vikings brought it. The widespread distribution of Scandinavian material culture together with place-name evidence for the adoption of Old Norse as the dominant language, support the written account of the Viking settlement and overlordship of the islands.

Conventionally the term Viking period refers to the first couple of centuries of Norwegian rule. Thereafter, from the eleventh century, the term Late Norse is used (see note on terminology, Foreword). The terms Scandinavian and Norse are used interchangeably to refer to the historical period of Norse rule. Whilst such cultural labels have an ethnic connotation, their use here is restricted to the chronological sense and I make no attempt to assign ethnic labels to the sites or artefacts under discussion.

Various techniques are used to date sites in the gazetteer. Radiocarbon dates are available for fourteen sites (appendix 2). Coin finds date a further ten sites (appendix 3), but for the majority of sites dating is by artefact typologies and historical association. Radiocarbon dating provides the only means of dating unaccompanied burials such as that at Sandside, Graemsay (gaz. no. 61) but the technique can also be applied to stratified deposits on settlement sites. Sampling of stratified deposits to produce a suite of dates improves the statistical likelihood of obtaining more precise dates. Coins provide a *terminus post quem* and/or a *terminus ante quem* for associated contexts such as the two phases of chapel construction at the Brough of Deerness (gaz. no. 144) or the burial at Buckquoy, Birsay (gaz. no. 49). The limited usefulness of artefact typologies which are ultimately derived from Scandinavia for grave goods which may have been buried as heirlooms has been noted above (see 2.1.4). Similarly the use of historical association to date sites named in the *Orkneyinga Saga* applies only to a small number of sites. Exact locations of these sites are rarely, if ever, noted in the sources (1.1).

In the absence of radiocarbon and dendrochronological determinations structural dating has been done largely on the basis of typology. The excavations at Jarlshof, Shetland provided the initial model (Hamilton, 1956). There the ninth to eleventh centuries were characterised by two-roomed domestic houses with central hearths and side benches, and separate outbuildings for industrial and agrarian activities. By the early twelfth century the *longhouse* proper, complete with integral byre, was the norm and in the twelfth and thirteenth centuries houses were extended with porches and outbuildings attached. On the basis of this typology the settlements at Buckquoy (gaz. no. 050), Skaill, Deerness (gaz. no. 039) and the Brough of Birsay (gaz. no. 051) would belong to the first phase, although using such a system on settlements of which a considerable part is now in the sea, is clearly problematic. The real situation is more complex. The settlement at Skaill was occupied into the thirteenth century and yet lacks the archetypal Viking longhouse and there appear to be no byres (Gelling, 1984). Sub-rectangular and bow-sided building forms exist simultaneously at the Brough of Birsay (Hunter, 1986b) and a variety of roofing techniques can be postulated; these must have used timber support systems, as attested at both the Brough of Birsay and Pool, Sanday (Hunter, 1985; 1990). There is no doubt that we have

underestimated the amount of timber used in buildings. Crawford (1987) cited the example of the wooden floor excavated at the Biggins, Papa Stour, Shetland, but more pertinent to Orkney is the timber chapel identified at the Brough of Deerness, and possibly at St. Olaf's Church in Kirkwall. The position in this typological framework of such timber buildings and roofing systems is not clear.

Myhre, drawing on the work of Rolfsen (1978), devised a typology of boat houses or *nausts* in Norway in which rectangular *nausts* were Medieval, Viking *nausts* were more bow-sided and Roman and Migration period examples were more curved still. His typology is particularly relevant to Orkney since it provides a framework in which to place the boat house excavated at Westness which produced no dating evidence. As with all typologies, however, it requires testing and at present there is an insufficient number of excavated sites to do this in Orkney. Myhre also demonstrated continuity in the use of specific locations of *nausts* and analysed their distribution in relation to grave mounds as a means of understanding the political organisation.

Similarly the typology devised for chapels based on simple forms being early in the sequence of unicameral, bicameral and more complex forms, is far too simplistic (see 2.1.4). Few chapels have been excavated and those for which there are historical references, for example the Round Church at Orphir (gaz. no. 055) or St. Magnus' Cathedral, Kirkwall (gaz. no. 057) are obviously atypical.

Refinements in radio-carbon and dendrochronological dating techniques have recently led to a review of traditional artefact typologies based on art styles. The Börre, Jelling and Mämmen styles are now considered to have existed simultaneously. This means that material previously dated to the early Viking period is now thought to date to the second half of the eighth century, rather than the late eighth / early ninth centuries (Myhre, 1993).

Figure 19 shows the period of occupation of sites in the gazetteer. The major dislocations shown at AD 1100, 1200, 1300, 1500, 1600 and 1700 are in large part a product of the nature of the relative dating techniques and arbitrary divisions using terms such as Viking and Late Norse. Nevertheless, the continuity of settlement location both from pre-Viking to Norse times and into the later medieval period is striking.

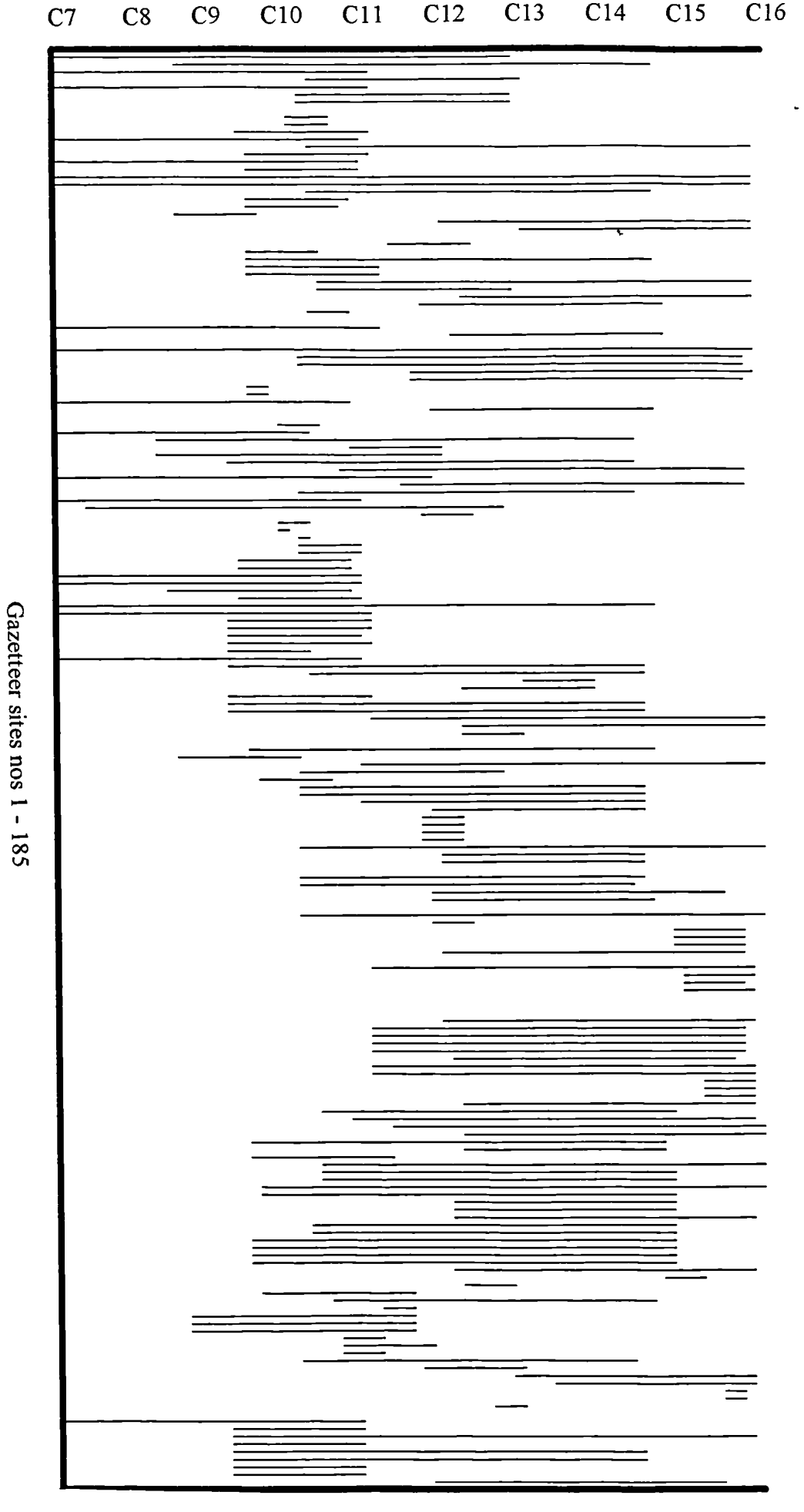


Figure 19 Occupation at gazetteer sites

2.2.1 The eighth and ninth centuries

The Viking settlement of Orkney in the ninth century is evidenced in the archaeological record by the appearance of new building types, burial customs, dress and artefact styles paralleled in Scandinavia. At the Broch of Gurness (gaz. no. 047) two Viking period long houses overlay the latest phase of the broch. Elsewhere, at Pool, Sanday (gaz. no. 001) an Iron Age round house continued in use into the eleventh century. Sub-rectangular buildings represented the first phase, each having a culturally mixed assemblage (Hunter, 1993). Similar buildings were found at Skaill, Deerness (gaz. no. 039). There no assimilation in the cultural assemblage was evident, although this was argued to be the case at Buckquoy (gaz. no. 050; Ritchie, 1977) and at the Brough of Birsay (gaz. no. 051; Curle, 1982). This suggests a degree of continuity and gradual change between the Pictish and Viking periods.

Burials containing distinctive Scandinavian artefacts and dress accessories such as tortoise-shell brooches and whalebone plaques were located close to Pictish period sites. In many cases the Viking settlements which they served have yet to be located. The settlement at Westness, Rousay (gaz. no. 027), for example, dates to the eleventh and twelfth centuries, at least two centuries later than the adjacent cemetery at Moaness (gaz. no. 028).

Dress fashions revealed through the grave goods are typical of Scandinavia at this time. Women wore woollen dresses fastened at the shoulders by oval brooches with beads strung between. They were typically buried with a variety of tools such as shears, needles, a linen smoother and comb. Men were buried with weapons, typically a sword, spear and shield, sometimes a bow and arrows and tools such as honestones and combs.

According to written accounts, Viking raids on England and the western seaboard of Scotland began in the eighth century and continued into the ninth century. It is possible that such raids were carried out from seasonal or temporary bases scattered throughout the Northern and Western Isles (Crawford, 1987). Excavation at The Udal, North Uist in the Hebrides located one such base, a small stone-built fort, dated to the mid ninth century and attributed to the Vikings. This class of site is missing from Orkney although it is possible that Iron Age promontory forts, such as that at Scuthi Head, Sanday (gaz. no. 005) were re-occupied at this time. The castle on Wyre (gaz. no. 035) may have served a similar purpose.

The story of the establishment of the Orkney Earldom is recounted in the *Orkneyinga Saga*, chapter 4:

> "One summer Harald Fine-Hair sailed west over the North Sea in order to teach a lesson to certain vikings whose plunderings he could no longer tolerate. These vikings used to raid in Norway over the summer and had Shetland and Orkney as their winter base. Harald conquered Shetland, Orkney and the Hebrides, then

> sailed all the way to the Isle of Man where he laid its settlements in ruin. During his campaign he fought a number of battles, winning himself territories further west than any King of Norway has done since. In one of these battles Earl Rognvald's son Ivar was killed. On his way back to Norway, King Harald gave Earl Rognvald Shetland and Orkney in compensation for his son, but Rognvald all the islands to his brother Sigurd, the forecastleman on King Harald's ship. When the King sailed back east he gave Sigurd the title of earl and Sigurd stayed on in the islands".

The details of the story vary in other sources. The *Heimskringla* (The Lives of the Kings of Norway) written by Snorri Sturlason about 1225 dated Harald's voyage to c. 890, whilst an Irish source suggested c. 860. In addition the twelfth century *Historia Norvegiae* stated that the viking pirates, related to Rognvald, utterly destroyed the Picts in Orkney and Shetland.

On the contrary the archaeological evidence discussed above suggests, that there was Native-Norse interaction. Furthermore it is impossible to infer from the archaeological record that the Earldom was established prior to King Harald's voyage, as the written evidence suggests.

2.2.2 The tenth and eleventh centuries

New site types, hoards and fortified sites appear in the archaeological record for the first time in the tenth century. Written sources record that by the end of the tenth century, major expeditions from Scandinavia were directed against England. Thomson (1987, 34) suggests that this allowed the Orkney Earls scope to increase the Earldom's influence to embrace the Hebrides, the Isle of Man and even Ireland. The hoards and castle sites suggest that these were far from peaceful times, but that they were also prosperous.

Five hoards are known to have been deposited in Orkney between c. AD 950 and 1035 at North Town Moss, Burray; Skaill, Sandwick; Caldale, Kirkwall; The Ring of Brodgar and Loch Stenness, Stenness (gaz. nos. 062, 063, 064, 065, 066). Three of these were discovered in the nineteenth century, one in the eighteenth century and one in the seventeenth century. The documentation of the discoveries and even the location of some of the finds is therefore understandably fragmentary. The hoard from Loch Stenness and some of the Caldale material are now lost. The remaining hoards are held in the National Museums of Scotland and the British Museum.

The largest of the hoards, that from Skaill, weighed about 8kg, similar in size to hoards from the Sacndinavian homelands. It contained silver neck rings, arm rings, ring money, ingots, hack silver, thistle brooches and coins. The Caldale hoard contained 300

coins of King Canute, minted 1025-1035, and ring money. The hoards provide certain proof of the wealth of at least some people in Medieval Orkney. They may also indicate a period of unrest or be evidence of an early banking system. Although there was no mint in Orkney currency, both in the form of coins and ring money, was in circulation. James Graham-Campbell among others deals with the significance of these and other hoards from Scotland (Graham-Campbell, 1976; 1993; Kruse, 1993).

Burial practices seem to have been changing before the recorded date of 995 for the conversion to Christianity and at least one chapel, the Brough of Deerness (gaz. no. 044) predates the conversion. Many graves with accompanying goods can be dated to the ninth century and the remainder to the tenth century, though this probably reflects the limitations of the dating of grave goods by typology, rather than the actual date of the burial. Scholars have assumed that the deposition of grave goods was a pagan custom, but this need not be the case. Lamb (1993) has recently argued that Orkney continued to be Christian before and during the Norse period, that the evidence for pagan worship is slight and that an alternative explanation should be sought for extravagant burials with rich grave goods. Such burial customs provided a means of displaying the status and wealth of the deceased and his or her kith or kin. It is difficult to evaluate Lamb's thesis since so little is known about Late Norse burial practice in Orkney. There is only a single published burial, at Sandside, Graemsay (gaz. no. 061). The burials found adjacent to the Late Norse chapel at Newark, Deerness (gaz. no. 096) have not been published. There are, however, precedents elsewhere for Christian burials being accompanied by grave goods and grave markers bearing "pagan" Scandinavian art. The hogback tombstones found in Northumberland, Scotland and Orkney are good examples of this. Assuming that Christian monastic sites continued throughout the Norse period then Lamb's reasoning seems logical.

Social structure

The literary sources record a stratified heroic society in Orkney. The Earldom, sometimes sub-divided into two or three territories, each with its own Earl, paid tribute to Norway. Each earl's survival was dependent upon his maintaining the support of his *hird*, a band of warriors. Below this class there were *gödings* (ON goeðingar) and *bonder* (ON bondi; Crawford, 1987). The *gödings* were rich followers of the earl(s). They owned or ran large estates on his behalf. *Bonder* were the common farmers. Slaves or thralls (ON þraell) may have served in the households of the earl, his *hird* and the *gödings*, but there is no record of a class of freedmen (ON leysingar) in Orkney. There is little discussion of the role of women.

The number and type of grave goods deposited in inhumations, both male and female, in the ninth and tenth centuries may reflect the social status of the deceased, but to date no-one has attempted to categorise these in terms of the social strata known from the literary record, as has been done with limited success for Anglo-Saxon cemeteries (Dickinson *et al*, 1987). Wealth and power were reflected in settlements in the extravagant use of building materials, such as the exceptionally thick walls on the hall at Tuquoy (Owen, 1993), and the range of imported goods: pottery, glass, steatite, metalwork and coins. Runic inscriptions provide evidence for the presence of at least some literate people. The archaeological record sheds little light, howver, upon the existence of slaves, freedmen or *bonder*.

Land ownership and taxation

Thomson (1987) recorded seven different denominations of land in the Viking and Late Norse periods, each with different ownership and levels of taxation: *kingsland*, *bordland*, a*uld earldom*, *conquest land*, *bishopric estates*, *kirklands* and *odal* or *udal* lands. *Odal* land was private land, in the ownership of the *bonder* who held it in freehold, but were subject to the payment of tax (*skat*) to the earl and to the church. Before 1468 the Norwegian Crown owned certain estates in Orkney (*kingsland*). Those lands belonging to the earls of Orkney (*bordland*) were exempt from taxation. Fifteenth century rentals also refer to a category of *auld earldom* lands which apparently formerly belonged to the earl(s), but which were gifted or sold and were therefore subject to taxation. The *bishopric estates* belonged to the Bishop of Orkney. *Kirklands* belonged to individual parish churches and chapels whilst *conquest land* was land acquired by force, purchase or exchange rather than by inheritance. Marwick (1949) and Clouston (1928) debated the existence of naval levy territories (Old Norse Leidang) which superseded land ownership boundaries but the identification of any of these territorial divisions in the archaeological record is virtually impossible, nor is clear if there were also enclosed field systems.

2.2.3 The twelfth and thirteenth centuries

Many new gazetteer sites in the twelfth century were chapels. Occupation of some settlements ended during the twelfth century. There is little archaeological evidence as yet for what replaced these settlements. The Brough of Birsay went and other sites in Birsay Bay out of use during the twelfth century. The Earldom court moved to Kirkwall where a residence existed in the eleventh century, according to the *Orkneyinga Saga*. The neighbouring farms in Birsay Bay which probably supplied the Earl's residence went into decline.

The twelfth century marks the end of the Viking period and the beginning of what is often termed the Late Norse period. Orkney was then part of a sort of early European Community with links with Scotland, Norway, Sweden, Denmark, England, Russia and parts of the German Empire and also with Rome, Jerusalem, Constantinople and Provence (Thomson,1987, 63). The transition is far from clear since such contacts are evident as early as the eleventh century in hoard material and the design of churches such as the Round Church at Orphir.

Historically the end of the twelfth century and the beginning of the thirteenth was a critical period of power politics between Scotland and Norway. In 1195 Earl Harald Maddadson relinquished independence to the King of Norway, rescinded his title to Shetland and handed over some of his Orcadian revenues. Shortly afterwards he surrendered Caithness to King William of Scotland who in turn gave it to the King of Man, although it was later restored to Harald (Duncan, 1989). Norway was later to cede the Hebrides and Man to Scotland. In the course of the thirteenth and fourteenth centuries the Orkney Earls were increasingly of Scottish rather than Norse descent.

2.2.4 The fourteenth and fifteenth centuries

Little information is available on sites occupied during the fourteenth and fifteenth centuries. Those gazetteer sites which continued in use from the previous century are almost exclusively chapels or *bordland* and only a few settlements. This simply reflects the paucity of excavation of late Medieval sites, perhaps because many lie beneath present day farms and villages. The holdings listed in the rental of 1497 gives an idea of the density of settlement at this time. Most of these sites are still occupied.

This dearth is counterbalanced by the relative wealth of historical material for the period. By now the ruling earls were all from the Scots nobility. They played little part in the direct government of Orkney, appointing managers such as the tyrant David Menzies of Weem for this purpose. The title of the islands now fell to Denmark who were united with Norway. The church was also increasingly influenced through Scottish affiliations, although the bishopric of Orkney was still officially subject to Nidaros, Trondheim, Norway (Crawford, 1977).

In 1468 The Danish King ceded or rather pawned Orkney and Shetland to James III of Scotland as the dowry for his daughter's marriage. In 1470 King James III ended the Orkney Earldom with the removal of Earl William. This was followed in 1472 by the transferral of the bishopric to the jurisdiction of St. Andrews.

The manner in which the political events of the later fifteenth century affected everyday life is beyond the scope of this thesis.

Summary

The maritime cultural landscape of Viking and Late Norse Orkney comprised a wide range of site types: settlements, maritime structures, burials and cemeteries, hoards, isolated finds, chapels and monasteries, *thing* sites, runic inscriptions, *bordland* territories and industrial sites. The most numerous were settlement, estimated to total between 200 and 500 during the period of Norse overlordship: farms, halls, hamlets, at least one town at Kirkwall, strongholds and other defensive sites characterised by their megalithic structure. The latter was probably as much a means of conveying the status of the owner as it was a characteristic of function. Chapels, burial grounds and a range of maritime structures served these settlements. Seventeen different forms of maritime structure were identified, some for the first time through field survey and place-name studies: harbours, boat shelters, slipways, landing places, portages, ballast sites, navigation beacons, shipwrecks, jettison sites, anchorages, boat building sites, fish weirs and ponds, crannogs, causeways, flood defences and sea walls.

The majority of sites were situated on the coast to take advantage of sea communication routes. These coastal sites are vulnerable to erosion. In some cases this can be fortuitous - erosion reveals sites as well as destroying them. Many of the sites discussed in this chapter were identified by the author during a series of coastal surveys of the islands conducted in the summers between 1991 and 1993. In the absence of diagnostic artefacts and structures it is difficult to date sites found in this way. The survey, however, revealed a settlement pattern; frequently Viking settlements were situated close to later medieval chapels and earlier Iron Age brochs. Sites were therefore dated by their context. In the absence of evidence to the contrary it was assumed that settlement remains belonged to the Viking and Late Norse periods when they were situated close to both a chapel and broch.

Written evidence supplements and sometimes contradicts the archaeological record, providing information on social structure, land tenure arrangements and the formation of the Earldom. Written sources date the Viking settlement of Orkney to the ninth century and the end of Norse rule to 1468/9. Norse overlordship therefore lasted for approximately five and a half centuries.

For much of this time, particularly from the thirteenth century, archaeological remains are rare. Burials with grave goods become scarce after the tenth century. Only one Late Norse cemetery at Newark, Deerness (gaz. no. 096) has been excavated, but is unpublished. Whilst much is known about chapels and other ecclesiastical sites (Lowe, 1987), little information is available on late medieval settlements.

The gazetteer in appendix 1 and the information provided in this chapter form the most up-to-date register of Viking and Late Norse sites in Orkney. It will be necessary in future to amend and expand this database in light of new discoveries and research.

Having established theoretical, historical and archaeological frameworks of Orkney's maritime cultural landscape, it now remains to outline the geographical framework. This is the subject of chapter 3.

CHAPTER 3 Reconstructing the Medieval coastline and topography

3.1 The dynamics of coastal change

Orkney lies in a dynamic environment of coastal change. The range of coastal landforms there bears witness to this: spits, tidal lagoons, sea cliffs, mud- and sandflats, storm beaches, tombolos, salt marshes, beaches, barriers, bars, stacks, natural arches, blow holes, caves and dunes. There is, however, little empirical data available on the rate or the nature of this change. This chapter has two aims: to outline how the coastline has changed since the Viking period and to ascertain how coastal change in the islands today is affecting the discovery and survival of Viking and Late Norse archaeological sites. Alternative strategies for the management of coastal sites are also discussed and recommendations offered. This discussion is particularly relevant to this thesis since much of the maritime cultural landscape of Viking and Late Norse Orkney remains unknown, but is under threat of erosion. An unknown number of sites has already been destroyed by erosion, and the coastal sites listed in the gazetteer are all vulnerable to some extent. It is essential that a policy is adopted both to ascertain, through periodic field survey, what sites exist and are being revealed by erosion, and to determine how best these might be recorded / preserved.

The Orkney Islands Council has just begun, in the last year, to assess the rate and impact of coastal erosion, following escalating storm damage over a number of winters. Lamb noted the threat of erosion to archaeological sites during archaeological surveys in the 1980s (Lamb, RG, 1980; 1982; 1983; 1984; 1987; 1989). Erosion was already an issue, however, in the statistical accounts of the eighteenth and nineteenth centuries. Of course change is not limited to erosion, there are equally areas of deposition and more importantly changes in current flows and navigable sea routes.

The picture is complicated still further since there must also have been change during the Viking and Late Norse periods. One cannot expect the coastline to have remained constant over five and a half centuries. On the contrary, the four centuries from AD 800 to 1200 saw climatic change when the average mean temperature is estimated to have risen between 0.5°C and 2°C (Hunter, 1986b, 32; Whyte, 1985, 30; Morrison, 1991, 7). Changes both in sea level and in the prevailing wind direction may have accompanied this warming.

The factors influencing coastline evolution are diverse and complex. The results discussed below come from published literature, information supplied by the Admiralty Hydrographer; primary research on Ordnance Survey maps, Admiralty charts and a questionnaire survey of local inhabitants, combined with coastal inspection to assess the rate of change at various places throughout the islands.

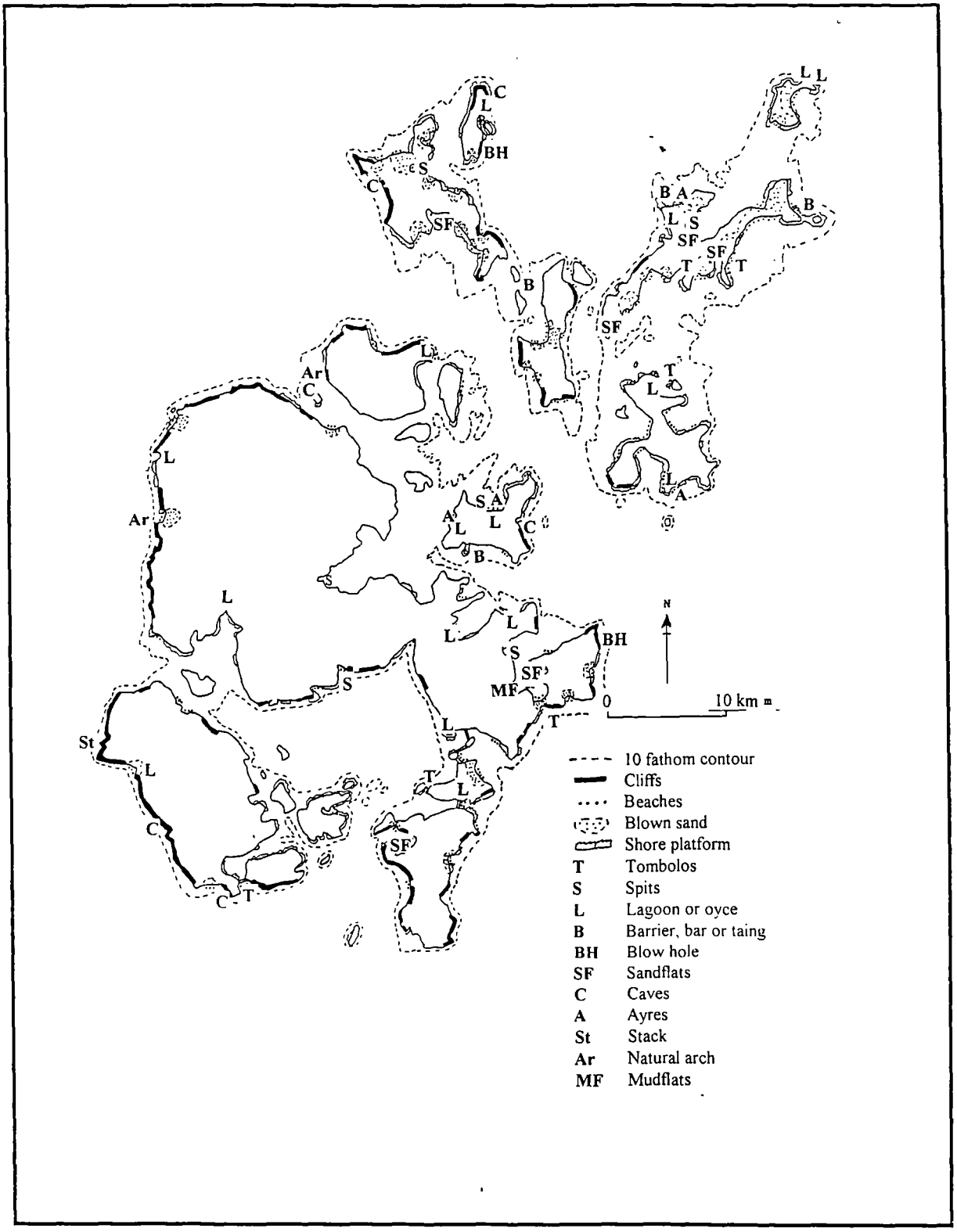


Figure 20 The Orkney Coast

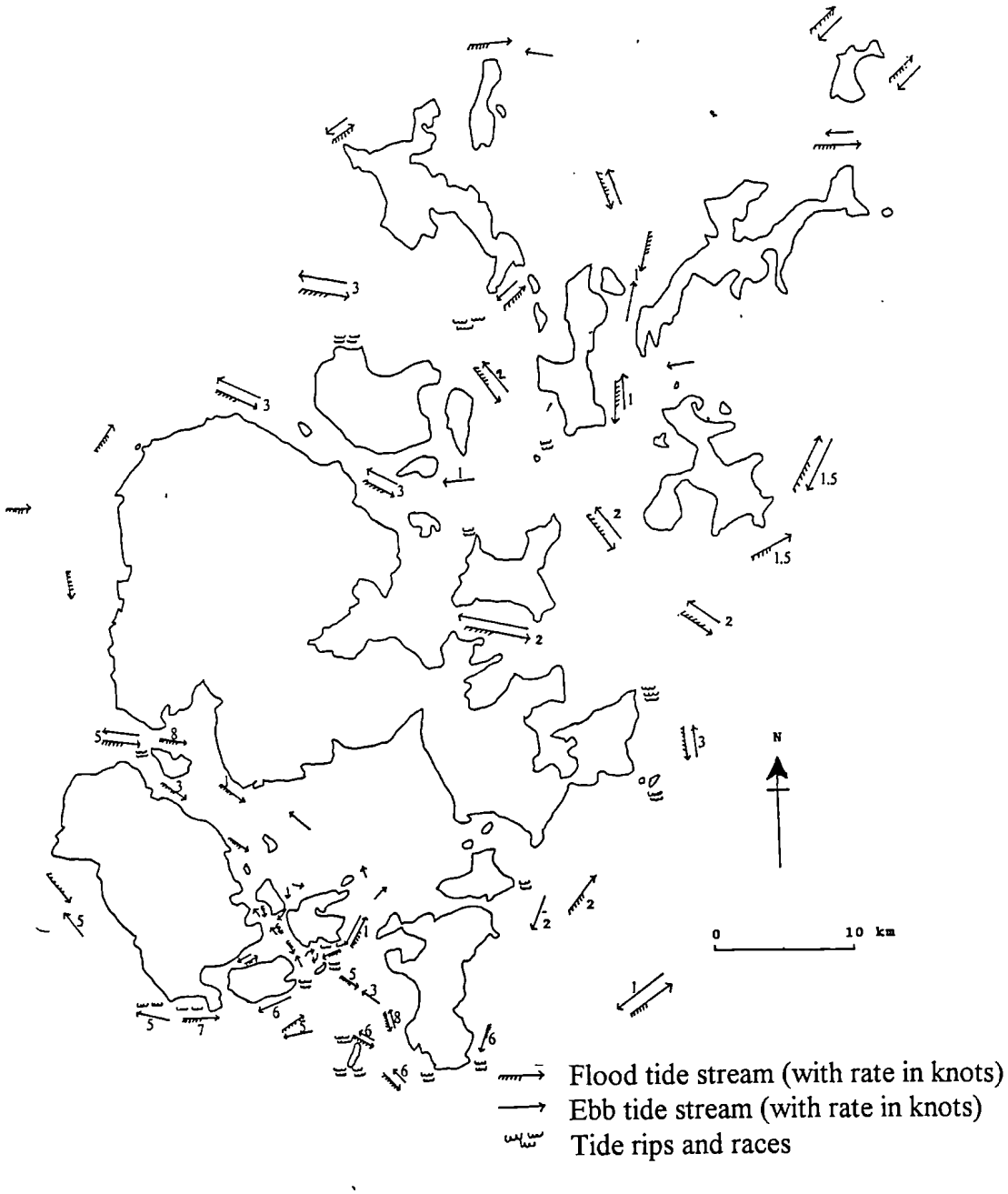
3.1.1 The coastline today

In geomorphological terms Orkney has a submerged coast, shaped by the Holocene marine transgression. This is evident in a map showing submarine contours (figure 20). The Holocene coastline has not remained static, and the Orkney coast today, characterised by a diversity of landforms, bears the imprint of thousands of years of change. Developed cliffed coasts with caves, natural arches, blow holes and stacks blend into low shore platforms, themselves once cliffs, and then into sandy bays. Sand-filled geos, caused by faults in strata provide some shelter along cliffed coasts. Elsewhere there are sand and shingle beaches at the heads of broad bays and along sheltered and open coasts. Most beaches are thin veneers over rock platforms.

The coastline is dynamic and erosion is rife. Pockets of blown sand occur on most islands. As its name suggests, the island of Sanday is largely sand. These dune systems are notoriously unstable. Sand buried the Neolithic settlement of Skara Brae in the Bay of Skaill, Sandwick until earlier this century when the dunes eroded away in a storm. Such erosion, whether marine or wind generated, is exacerbated by extraction. A seawall protects Skara Brae but other archaeological sites are not so fortunate and it is possible to calculate the rate at which some of these are being destroyed (see 3.2.3). Storm beaches, sometimes thrown several metres clear of the shore, are further testimony to the power of the sea, and there are both seasonal and longer term cyclical changes in the foreshore with the periodic removal and replacement of sediments.

Deposition is evident in the formation of sand and shingle spits. These sometimes retain brackish lagoons, often tidal, but some are now completely isolated from the sea. In Orkney these have specific names: *ayres* and *oyces*. Tombolo beaches, spits linking islands, have formed on Sanday, the Deerness peninsula and South Walls. Bays that experience a wide tidal range have either sandflats or mudflats, according to whether there is also a river mouth. These formations along with salt marshes are characteristic of areas undergoing deposition.

Man-made barriers now link several of the islands. Their construction has had a profound effect on local coastal morphology. Four artificial barriers connect Mainland Orkney with the southern isles of Burray and South Ronaldsay. Built during the Second World War to prevent German U-boats entering the Naval Base at Scapa Flow, the Churchill Barriers now retain beaches on the east side, and to a lesser extent on the west. The barriers block two former important shipping routes from Scapa Flow to the North Sea and there has been a complete change in sediment and current patterns (3.2.2). The Ayre that now links South Walls to Hoy Island was originally two shingle spits. It was bridged earlier this century. A beach has now formed along the length of the causeway.



Information derived from Admiralty charts and Atlas of Tidal Streams

Figure 21 Tidal streams around Orkney

Similarly a wall built in the 1920s retains the tombolo beach on Papa Stronsay. Taings, natural tidal causeways or barriers, have also been artificially enhanced, both in antiquity and in the modern day, to carry roadways or tracks, and possibly fish traps (see 2.1.5).

Kirkwall occupies land reclaimed from an oyce, the Peerie Sea that is now land-locked (3.2.1). The waterfronts at Finstown, Firth and Pierowall, Westray are also built on reclaimed land. The construction of modern harbours, piers, sea walls, breakwaters, jetties and quays on almost every island has also had an effect on coastal morphology.

The pattern of tidal streams around Orkney is complex (figure 21). There is evidence for the increasing frequency of tidal surges (Orkney Islands Council, pers. comm.). When these coincide with very low pressure tidal levels rise by as much as one metre above normal and cause considerable erosion damage. This happened in January 1993 when emergency repairs and improvements to coastal defences cost in excess of £250,000.

Managing Orkney's coastline, which measures almost 1000 km (roughly the distance from Plymouth to Aberdeen by road), is problematic. Until recently coastal defences were built without consideration of the effect their construction would have further along the coast. A few key archaeological sites are partially protected by concrete sea walls: the Knap of Howar, Papa Westray; the Broch of Gurness, Evie; The Brough of Birsay and Skara Brae, Sandwick. Building and maintaining these structures is expensive, however, and alternative management strategies are now being sought.

3.1.2 Factors influencing coastal change

A combination of factors influences the location, nature and rate of coastal change: sea and land level change, wave action, cliff morphology and human interference. These processes are themselves complex and rely on a number of factors such as the climate, weather, currents (ocean, tidal and wind generated), catastrophic events such as volcanic eruptions, the local geology and seabed topography, the depth of water and the exposure of the shore. In Orkney the effect of virtually all these elements is evident.

Sea level change

Global warming as a result of the *greenhouse effect* is causing the thermal expansion of seawater and the melting of glaciers resulting in a world-wide rise in sea level. There is considerable debate about the magnitude of this. The Orkney Islands Council is currently assuming a rise of about 0.7m by the year 2100 (Orkney Islands Council, 1994). Estimates vary from 0.56m to 3.45m by the year 2100 (Tooley & Shennan, 1987).

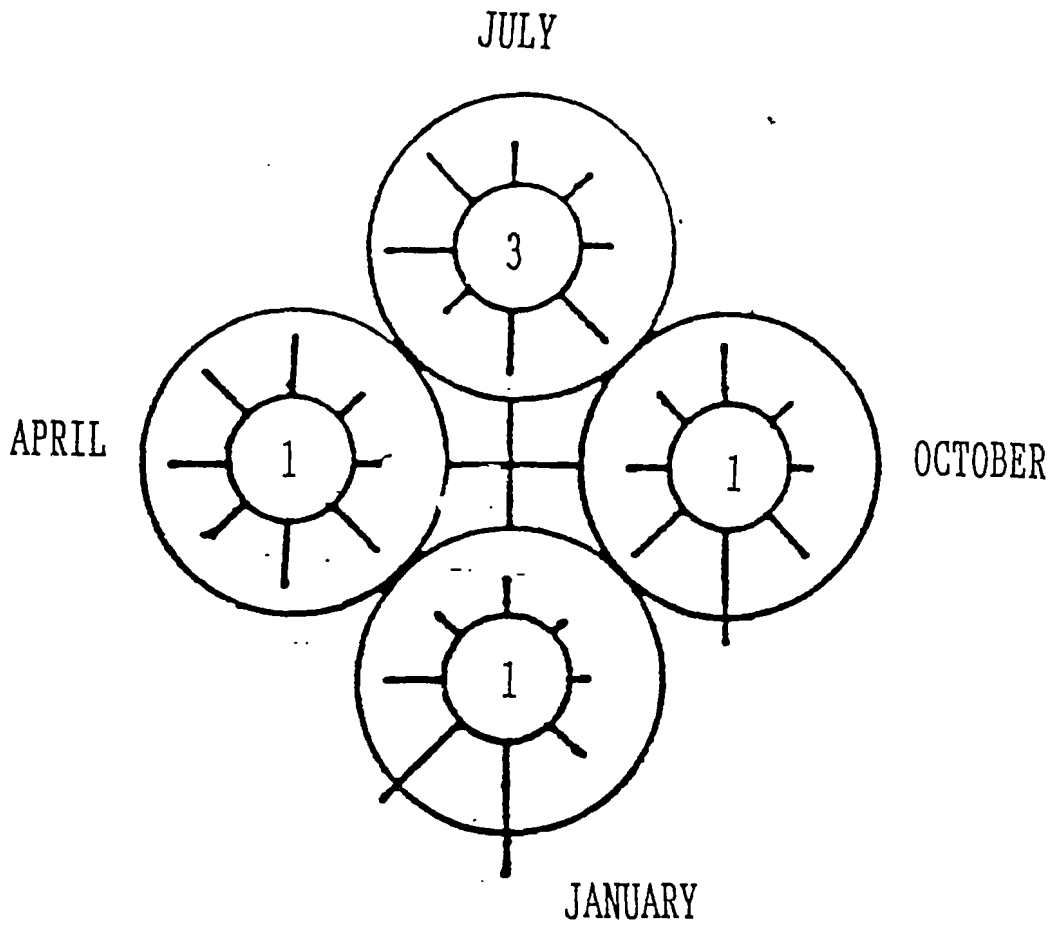


Figure 22 The percentage frequency of wind and gale directions at Kirkwall airport (based on McKee, 1983)

Land level change

Dennison (1892) reported the discovery of submerged forests beneath sand foreshores at the Bay of Otterswick, Sanday; Pierowall Bay, Westray; Mill Bay, Stronsay; and Storehouse Bay, North Ronaldsay. These forests provide clear evidence of the submergence of Orkney during the Holocene marine transgression (3.1.1), but do not necessarily indicate tectonic subsidence.

The north of Britain is said to be rising whilst the south and east are sinking (Bird, 1984). In reality the situation is more complex. Tidal gauge records from stations around the British Isles (Pugh & Faull, 1983; Shennan, 1987) indicate that Shetland and the area around Inverness are rising whilst Aberdeen on the east coast of Scotland and the Western Isles are falling. There is no record for Orkney. A measuring station was established in Orkney and another on the Pentland Firth just three years ago. Research is currently being conducted there by Prof. David Smith from the Department of Geography at Coventry University, but the preliminary results of this project are not yet available (Ian Shennan, pers. comm.). The most recent review of sea and land level changes in Great Britain suggests that mainland Scotland is rising by over 1mm per year, rising to 2.5mm in the highlands and the west coast of Scotland (Shennan, 1989).

Wave action

It is through wave action that the effects of the wind and currents are wrought on the coastline. The wind is critical both in the evolution of the Orkney coast and in determining local weather patterns, not least because it is ever present (figure 22). In the North Atlantic the flow of the prevailing westerly winds governs the creation and dispersal of depressions and anticyclones (Whyte, 1985). Winds also generate the waves and currents which together with the tides create the pattern of nearshore water circulation that moves coastal sediment, causing both erosion and deposition. Winds are common from all directions, although southerly and south westerly winds have the highest frequencies. Gales are common; on any one day there is a 37.5% chance of a gale (Davidson & Jones, 1985). This combination of wind strength and variability in direction means that any exposed coast, where there is a long fetch (distance of open water over which the wind might travel), is a high energy environment subject to prolonged and potentially severe wave damage. The west coasts of Mainland, Rousay, Hoy and Westray, northern Papa Westray, north-west North Ronaldsay, western South Ronaldsay and southern Stronsay are examples of such coasts.

Seabed topography is both a cause and a result of wave action. Where there is a shallow shelf around the islands the force of the waves is dissipated somewhat before reaching the shore. The depth of water inshore may alter significantly with the tides and this

too affects wave penetration. Similarly, a shingle beach affords more protection against erosion than a bear rock platform.

Bird (1984) considered tidal currents, produced by the ebb and flow of the tide, to be of limited importance in terms of erosion, deposition or sediment flow. The converse is true where human interference or natural causes such as storm surges interrupt the flow. For example, the construction of causeways between the southern Orkney islands has stopped the flow of sediment east to west through Scapa Flow. In the same way storm surges produced by areas of very high or low pressure on the sea surface result respectively in unusually high and low tides which in turn trigger coastal change.

Cliff morphology

Both underlying rock formations and surface till affect the rate of change. They undergo physical and chemical weathering: soil creep, frost shattering and the action of acid rain, as well as by the sea. Soft coasts (sand, mud and shingle) are more liable to erosion than hard coasts (shore platform and cliffed coasts), although this depends on the factors previously outlined.

Human interference

Significant upsets to the marine cycle are also probably wrought by human interference, intentionally as in the case of harbour and sea wall construction, or unintentionally, as in the case of global warming. The construction of sea walls and harbours leads to scouring of the coast immediately downstream of the barrier, and eventually to the deposition of sediment along the coast (in the direction of longshore drift). Sand extraction disturbs dune formations and can aggravate wind erosion. The loss of sand from the beach has a knock-on effect causing coastal denudation both at the site of extraction and further along the coast.

3.2 Assessing the change

In 1974 the Department of Geography, University of Aberdeen published a survey of Orkney beaches at the request of the Countryside Commission for Scotland (Mather *et al*, 1974). This report comprised an inventory of the beaches of Orkney to provide data for conservation and recreation-development planning. One of the objectives of the survey was to assess the dynamics and rates of change of the beaches. The authors identified several causes of erosion and deposition and were able to characterise such areas.

Archaeological surveys by the Orkney archaeologist in the 1980s identified areas of erosion where known sites are under threat of destruction such as Tuquoy, Westray and Strömness, North Ronaldsay. In some cases it is this very erosion that reveals sites. The discovery of the Neolithic settlement at Skara Brae in the 1920s and in 1991 a Viking boat burial at Scar, Sanday are just two examples. Excavation at Kirkwall (McGavin, 1982) has revealed how the waterfront has changed since the early medieval period. The Peerie Sea, now a lagoon but formerly open to the sea, has been partially infilled and developed.

The statistical accounts of Orkney provide some information on changes in recent centuries supplemented by Ordnance Survey maps and early Admiralty charts, although analysis of these is not straightforward. Field survey and interviewing local people by questionnaire proved more successful methods of obtaining accurate information. However, these sources shed light at best only on the last couple of centuries of coastal change. In 3.2.4 the climatic differences between the modern day and the medieval period are investigated and a model of coastline development from the tenth to fifteenth centuries offered.

3.2.1 Previous studies of coastal change in Orkney

The current understanding of coastal change in Orkney relies upon a handful of different sources, each compiled for different reasons. Together these sources reveal a continuing pattern of change, accelerated in the last fifty years by human interference. Erosion and deposition occur in close proximity. The balance between the two is fine and is governed by several factors (outlined above). Coastal archaeological sites are particularly vulnerable and in some areas the coastline has evidently changed substantially since medieval times.

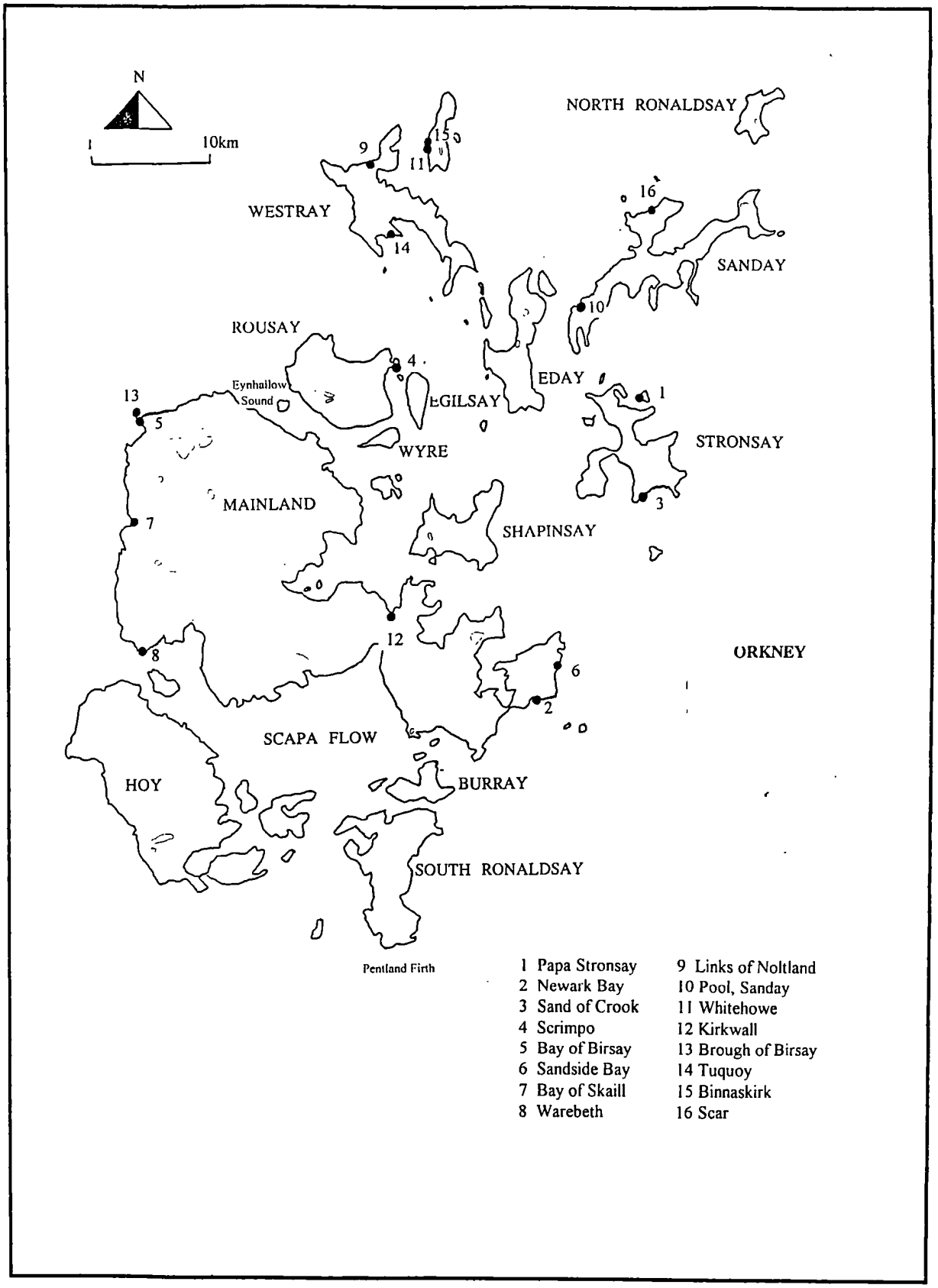


Figure 23 Sites mentioned in chapter 3

Beaches

The inventory by Aberdeen University comprised 83 beach units variously classified as bay head and open coast types, with sub types according to whether the energy environment was high or low, or the extent to which the beach was fully developed (Mather *et al*, 1974; Mather & Ritchie, 1977). Short beaches of shallow gradient with a high lime content and a low mean dune height, a product of the frequency of winds, are the most common type of beach in Orkney.

Most of the beach complexes were considered to be relatively stable in relation to natural conditions, although in some places sand extraction and a large rabbit population had upset the natural balance. Severe erosion, where the area of erosion constituted between 5 and 20% of the blown sand area, was noted at four beaches: Papa Stronsay; Newark Bay, Deerness; The Sand of the Crook, Stronsay and Scrimpo, Rousay (figure 4). Erosion damage was medium, i.e. less than 5% of the blown sand area, at 10% of Orkney beaches. Erosion at the other 70 or so beaches was negligible. The results of my own field survey did not support this optimistic figure (3.2.3). Some erosion is active on all beaches; it is the mechanism by which coastal landforms evolve.

The characteristics of severe erosion were identified as: storm beaches, blow outs, high beach gradients and truncated dune systems. In turn a long fetch, extraction, cusps, artificial barriers, lack of shelter, a high beach gradient and deep water inshore were the causes of erosion. Erosion occurred along both open coasts and at bay heads with full dune systems and marginal beaches in high energy environments.

The characteristics of areas of deposition were: a beach build-up at the base of retreating cliffs, sand-filled geos, spits, bars and lagoons, salt-marsh and low beach gradients. Factors leading to deposition included the construction of artificial barriers, a sheltered coast with low beach gradients, shallow water inshore and U-shaped bays. Mather & Ritchie (1977) noted just six examples of prograding or accreting coastal edges in Orkney. All of these occurred near artificial barriers. Some complexes possessed both erosion and depositional characteristics and there is clearly an overlap between cause and effect; the construction of an artificial barrier, for example, might cause both deposition and erosion at different points along the neighbouring coast, or even further afield.

Virtually no attempt was made in the study to date changes to the beaches. Many of the features noted above may be seasonal and part of the normal annual cycle. The report was written as a conservation document with little concern for the impact of development or natural processes on the archaeology of the coastal zone, to the extent that the authors wrote of Papa Stronsay:

> The interest in the island is thus mainly historical and archaeological. The beaches and machair areas have limited recreational or ecological merit. In this

respect, the severe erosion of the machair area is of no consequence. (Mather *et al*, 1974, 64)

Fortunately, the Orkney Islands Council adopted a broader view of what constitutes an area of importance or interest. In a consultation document produced in 1993, as a first step towards formulating a coastal protection programme and a statutory policy document, a working party considered the impact of coastal change on infrastructure (roads, drainage systems, etc.), archaeological sites, quality agricultural land, buildings and built-up areas, the natural history and the amenity values of areas. The report examined a sample of thirteen beaches on mainland Orkney. Five of these contained important archaeological sites: the Bay of Birsay; Newark Bay and Sandside Bay, Deerness; the Bay of Skaill and Warebeth. The assessment of these sites is not yet complete, but all were classed as areas at a high risk of damage. There is existing but inadequate coastal protection at Warebeth and at Skara Brae in the Bay of Skaill.

Archaeological surveys

During the 1980s the Orkney Archaeologist, Raymond Lamb, surveyed several of the islands and found over one hundred eroding sites. At least forty of these dated to the Norse period (figure 24, after Ashmore, 1993). The figures for the 2nd millenium AD represent actual numbers, the others incorporate an estimate of those sites which are not closely dated and should therefore be treated with caution. The sharp increase in numbers from the beginning of the first millenium AD may reflect the increasing visibility of sites, rather than an actual increase in the number of eroding sites. The absence of Mesolithic sites may be accounted for by coastal change: these sites may probably lie close inshore in submerged peat beds found in several locations around the islands.

Some places, such as the prehistoric site at the Links of Noltland, Westray, are suffering from coastal deflation (a reduction in the height of the land surface due to desiccation and dune blow-outs). At the opposite end of the scale, in areas with a continual supply of blown sand, sites are being simultaneously conflated (increase in the height of the land surface, through the accumulation of refuse and natural deposits) and eroded; Pool, Sanday and other farm mounds are cases in point (see 3.3.2).

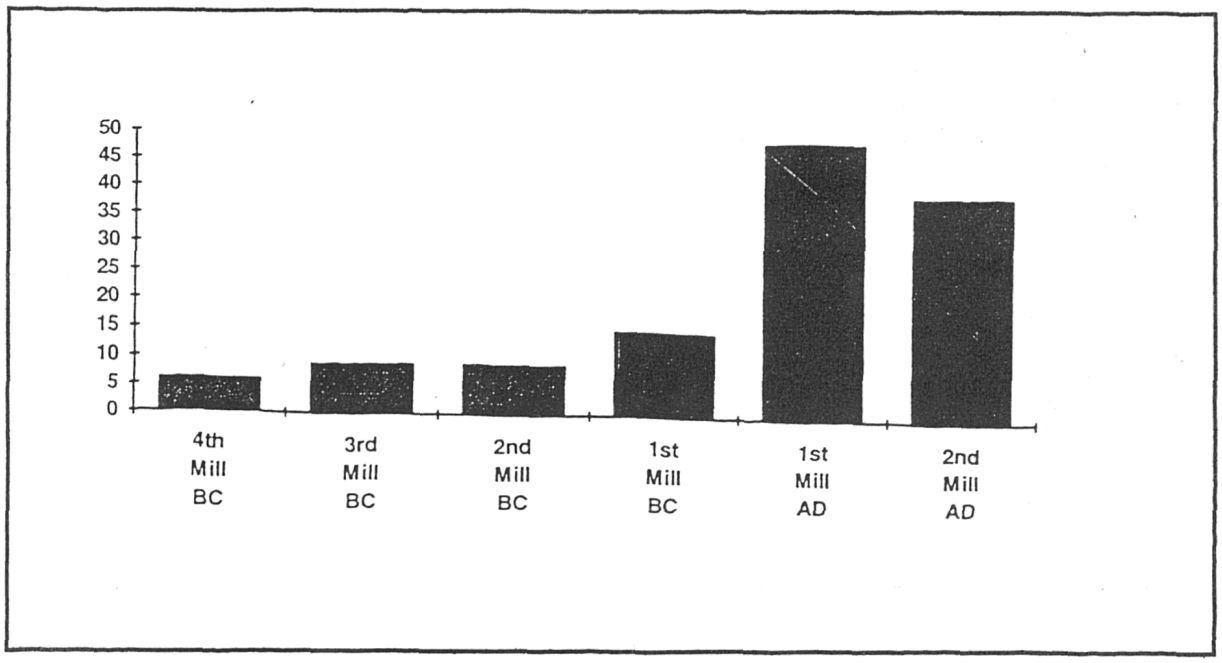


Figure 24 Erosion statistics (after Ashmore, 1993, 13)

In 1990 the present author conducted a survey of boat nausts on Papa Westray (Bowman, 1990). All but one of the structures was post-medieval. Several appeared on the first edition Ordnance Survey map, but almost without exception they had eroded by up to two metres. At Whitehowe (gaz. no. 17) on the west coast of the island, Lamb (1983a, 21) had previously identified the remains of a much older naust, about a hundred metres to the south of an Iron Age and possibly medieval settlement at King's Craig (gaz. no. 16) and about five hundred metres south of a Norse settlement focus near the chapel of St. Boniface (gaz. no. 018). In 1990 the shelter at Whitehowe (gaz. no. 017) was visible only in section (figure 25).

The bottom of the naust lay some two metres above the modern beach level and there was two metres of overburden on top of the *naust*. Several of the late nineteenth- and early twentieth-century nausts were partially infilled and were recognisable only as shallow horseshoe-shaped depressions in the ground. *Nausts* still in use remained clearly visible. The stratigraphic scheme developed from the study (figure 26) provided a method of relative dating that in turn served as a yardstick by which to measure the rate and nature of coastal change. By calculating the mean yearly loss of land it is possible to estimate that in the last 1000 years at least twenty metres of land has been lost in the vicinity of the *nausts*.

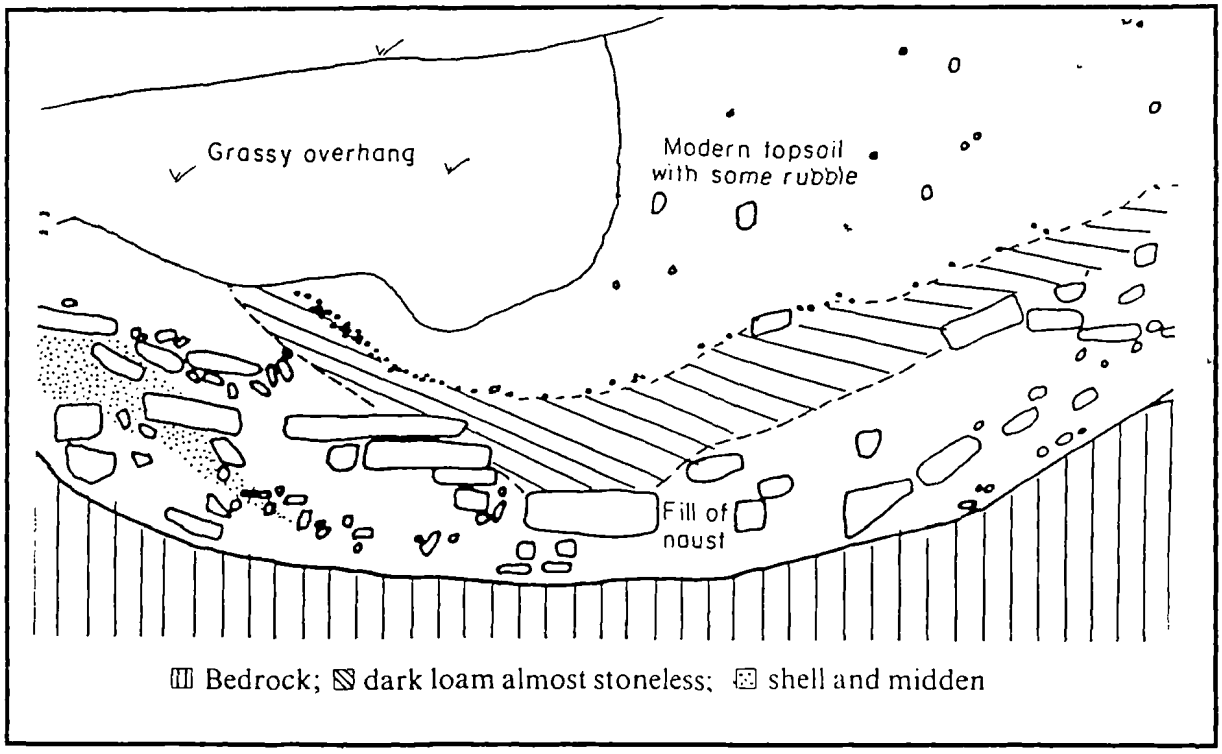


Figure 25 The boat shelter visible in section at Whitehowe, Papa Westray (after Bowman, 1990, 323; gaz. no. 017)

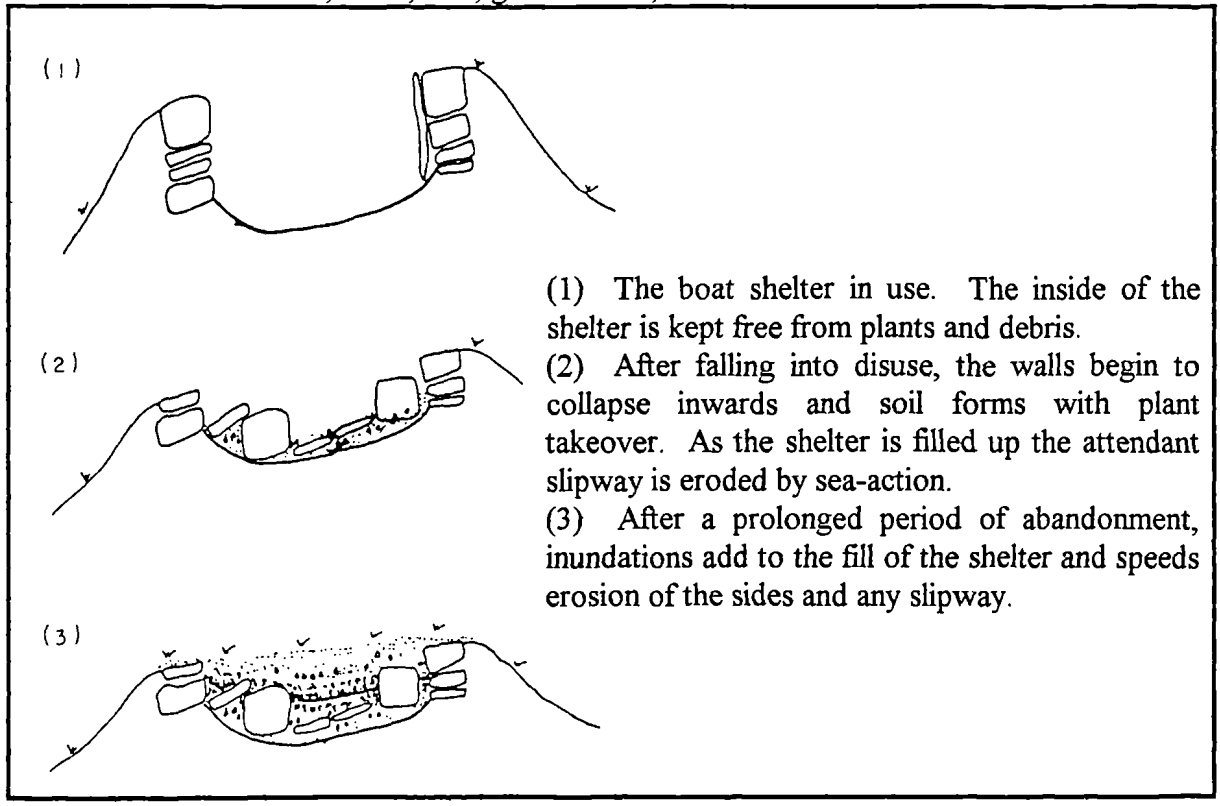


Figure 26 Scheme to show phases of use and abandonment of a boat shelter (after Bowman, 1990, 322)

Case study: Kirkwall

Archaeological survey and excavation at Kirkwall has revealed phases of deposition and land reclamation rather than erosion. The waterfront today is very different from that of the Viking period. The street plan of Kirkwall today (figure 27) fossilises the medieval layout, typical of a Norwegian town with a single main street, Broad Street, running parallel to the Peerie Sea (Gourlay & Turner, 1978). Broad Street marked the position of the medieval shore partially uncovered in excavations in Tankerness House (gaz. no. 169) and dated to the twelfth and thirteenth centuries (McGavin, 1982). Lamb *et al* (1986) found part of the fifteenth-century waterfront (gaz. no. 157). Traditionally, Viking ships are said to have sailed up to the steps of the Cathedral (Hossack, 1900). The modern waterfront occupies land reclaimed as early as the thirteenth and fourteenth centuries through to the nineteenth century (McGavin, 1982). The Peerie Sea, formerly a tidal oyce, is now landlocked and a band of land at least 250 metres wide has been reclaimed from it.

Kirkwall existed by 1035 when according to the *Orkneyinga Saga* Earl Rognvald was living there (Pálsson & Edwards, 1978, chapter 29). The construction of St. Magnus Cathedral began in 1137, followed shortly afterwards by the first Bishop's Palace (gaz. no. 137). The settlement probably grew into a market centre at that time. Virtually nothing is known of this early settlement, save a few chance finds (gaz. nos. 136; 176). It is likely that Kirkwall boasted a busy quayside with jetties and slipways like Bergen (Herteig, 1985) and Dublin (Wallace, 1981), though in stone not timber.

Birsay Bay

Erosion of the coastline of Birsay Bay, Mainland exposed several archaeological sites in the 1970s. *The Brough of Birsay,* now a tidal holm off the Bay and composed of a band of Stromness Flags, must once have joined the neighbouring Point of Buckquoy. It is unlikely that this was the case in Pictish or Viking times, although the two would have been closer then than now. Between excavations on the Brough conducted in 1938 and 1975 about two metres of cliff face (and archaeological deposits) were lost to the sea (figure 28). The overall site plan (gaz. no. 51) shows clearly that several buildings have fallen into the sea. In the last 1000 years some 60 metres has probably eroded away.

Erosion on a similar scale at the Point of Buckquoy and the Bay of Birsay triggered a series of rescue excavations in the 1960s and 1970s (Morris *et al*, 1989).

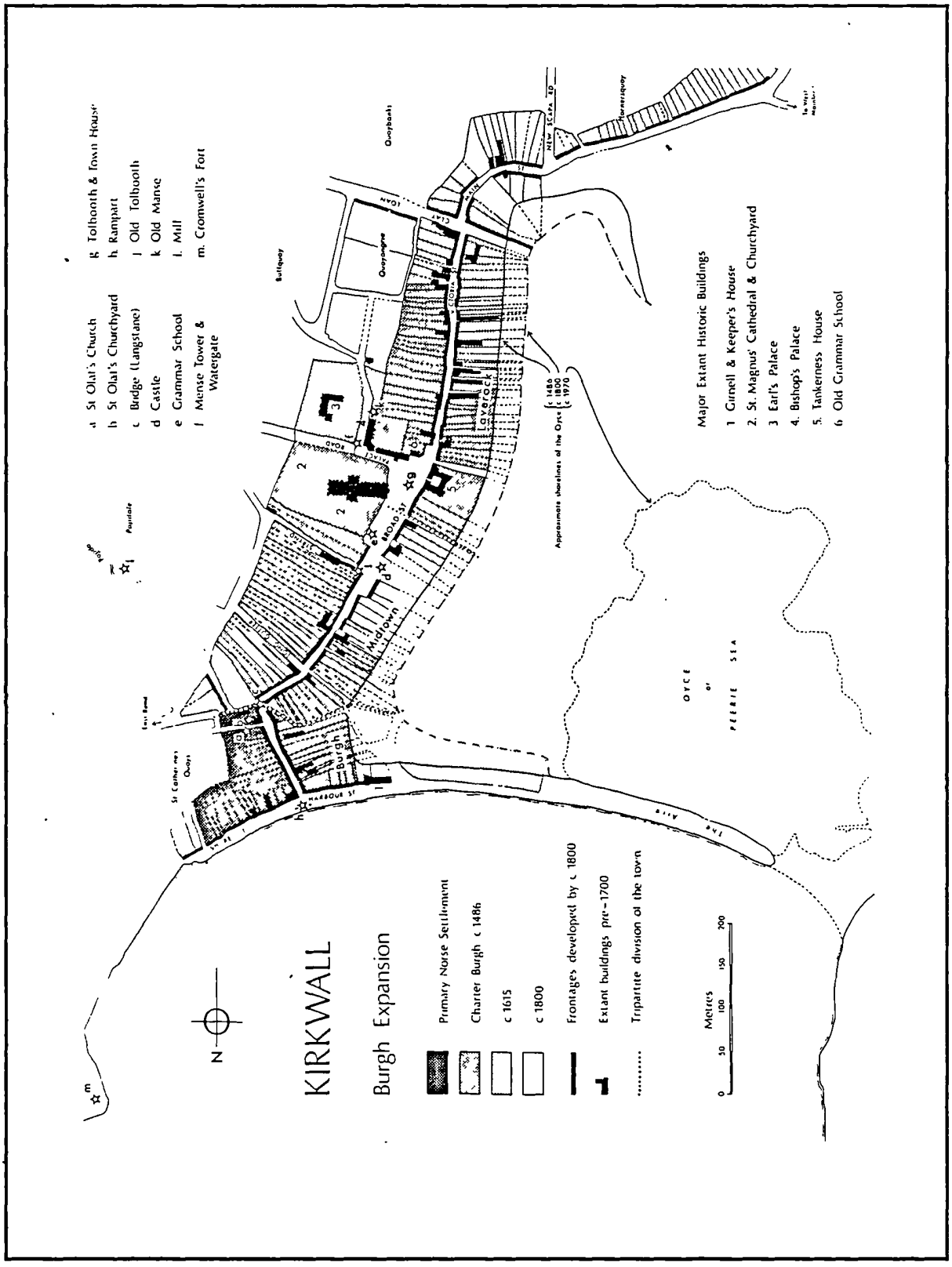


Figure 27 The development of Kirkwall (after Gourlay & Turner, 1978)

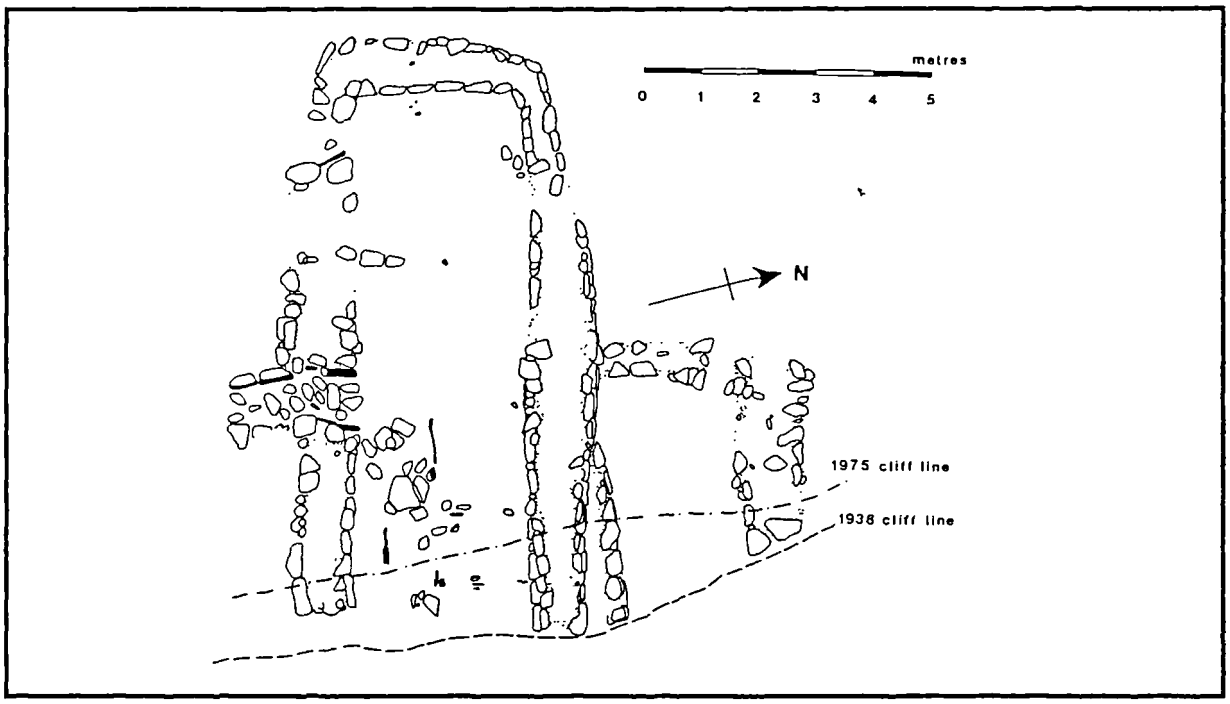


Figure 28 Erosion at the Brough of Birsay between 1938 & 1975 (after Hunter, 1986b)

Excavation in the islands is now restricted largely to threatened sites such as Tuquoy, Westray; Binnaskirk, Papa Westray: Pool and Scar, Sanday. Historic Scotland (Ashmore, 1993) has recently questioned the cost-efficiency of a policy of rescue excavation over coastal protection programmes. It is feasible to protect many sites with the money spent excavating a single site. Moreover the excavation of eroding sites can itself exacerbate the problem by exposing soft deposits and allowing undermining. Excavated sites also require coastal defences if they are to be retained for display.

Statistical accounts

The three statistical accounts of Orkney provide some information on changes in recent centuries. In 1799 (OSA, 1978) the minister of the parish of Cross and Burness in Sanday reported that "a shoal, 2 miles from the shore, on the north of Sanday, called Rinnabreck, was formerly land..." and that on North Ronaldsay "It sometimes happens in the high spring tides of March and April in a storm that the sea forces itself through a sandy bay on the south side, spreads itself over a low plain" creating an island. In 1841 (NSA, 1845) the minister of the same parish reported that some low lying areas of Sanday "have at one time been fresh water lochs or lagoons communicating with the sea".

In the third statistical account compiled in the 1950s (Miller [ed.], 1985) reports of coastal erosion were more frequent. In Birsay the sea had claimed "a few hundred yards" in

the previous century. The Sands of Evie, in the parish of that name apparently "burst their old bounds" and were "encroaching on the cultivated land beyond". Similarly the Bay of Tuquoy was apparently eating into the adjacent land. Written in the post war years, the account tells of some of the work of the Admiralty, including bridging Hunda and Burray as part of Scapa Flow's inner line of submarine defences, and the construction of the Churchill Barriers. Construction work on the barriers (explored in more detail below) caused flooding of some of the houses on the neighbouring coasts:

> With its flow through the Sounds being progressively impeded, the tide exerted a tremendous lateral pressure, which was greatest when the barriers were above sea-level, and were still not consolidated. At high tide a difference of several feet in the level existed on either side. Now, owing to silting, that effect is eliminated, but there is a slight rise in level on the eastern shores of Scapa Flow, especially on the south side of Water Sound. Some of the houses there along the Grimsness Road are built close to the beach on low-lying ground and several cases of flooding and damage to dykes have occurred with the spring tides. (Miller [ed.], 1985).

3.2.2 The evidence of Ordnance Survey maps and Admiralty charts

Maps provide a method of gauging coastal change over a wider area than either archaeological surveys or questionnaires. The production date also provides a *terminus ante quem* or a *terminus post quem* for the changes. The application of maps is limited only by the scale used and the accuracy of the map itself. I compared two series of Ordnance Survey maps of Orkney housed in the National Library of Scotland Map Library: the 25" second edition of 1901-3 and the National Grid series published at 1:2500 which was compiled in the 1970s. Admiralty charts go back further than the Ordnance Survey. The earliest charts sufficiently accurate and detailed to be of use were Murdoch Mackenzie's Orcades produced between 1747 and 1750, a series of five maps covering the entire island group and Graeme Spence's detail Orkney and Scapa Flow produced in 1812 which proposed the use of Scapa Flow as a naval base (Blewitt, 1957; originals were consulted in the British Library Map Library). The first official surveys of the Admiralty Hydrographic Office took place between 1835 and 1848 and they have been revised many times subsequently.

Ordnance Survey maps

The two series of maps used slightly different scales. There may have been a degree of error in the conversion of the early series into metric. This imprecision was, however, far outweighed by the discrepancy resulting from measuring. It was possible to measure to 0.5 mm, i.e. + / - 1.25 metres, though in reality an accuracy of 1 mm or + / - 2.5 metres was probably achieved. I targeted sites in the gazetteer (appendix 1) which were known from archaeological surveys to be subject to erosion or radical coastal change. All the measurements were taken from the closest corner of a building to the nearest shore (Mean High Water Springs mark). Obviously it was crucial to ensure that the same building was being compared in each case so the relevant maps were compared side by side.

The Ordnance Survey based its modern series of maps on the earlier series with limited correction using aerial photography and only corrected the coastline in areas significantly altered. Hence at some gazetteer sites currently suffering from erosion there was no apparent change, or even a gain in land. Whitehowe, Papa Westray; Tuquoy, Westray and Warebeth, Stromness are cases in point. Elsewhere change was noted. The Dane's Pier, Stronsay and Dingieshowe, Deerness, two dynamic environments where tidal streams meet, were both substantially altered in the later series. The Dane's Pier has changed significantly since 1902. Then the natural harbour was 60 m (200 ft) wide. In 1971 it was just 30 m (100 ft). The shape of the rock feature had also changed. An extra spit was mapped in the 1970s. This suggests that this is a geological feature rather than a man-made monument (gaz. no. 042). The sand bar at Dingieshowe has become narrower. By 1970 it measured only 30 m (100 ft) across as opposed to 55 m (180 ft) at the turn of the century. If the erosion were to continue at this pace the sea would break through the bar in less than 90 years. A field visit to the site suggested rather that sand is being deposited on the north side of the bar, but eroded from the south side so that the whole thing is moving northwards. Sandisand beach on the south side of the isthmus is open to long fetches and there has been some sand extraction that has no doubt accelerated the rate of erosion (Mather *et al*, 1974).

The relevant maps were not available for nine of the thirty-four sites considered. Seven sites showed erosion and two possible deposition. There has also been some reclamation, including the construction of a sea wall at Finstown, Firth. The remaining sites appeared unchanged (i.e. the measurements lay within the band of accuracy). Erosion was noted at Pool, Sanday; Howe, Cairston and Pierowall Bay, Westray.

Comparing the maps was a time-consuming, laborious task. Ideally it should be possible to compare digitised nineteenth-century maps with the modern series already digitised by the Ordnance Survey. Unfortunately this was beyond the scope of the present project, and perhaps of little use since as the sample selected demonstrated the maps

themselves are insufficiently precise to give more than an impression of coastal change in the islands.

Admiralty charts

Admiralty charts are most useful for the bathymetric and tidal stream data that they provide. The eastern approaches to Scapa Flow have changed considerably since the construction of the Churchill Barriers in the Second World War. I selected this area to study the extent and nature of the change (figure 29) in order to ascertain how the coastline may have appeared in medieval times. The barriers have cut off what were formerly key sailing routes into the natural harbour of Scapa Flow.

Since the construction of the barriers in 1942 small beaches had accumulated on the north east and south sides of the Weddel Barrier that joins Glims Holm to Burray (Mather *et al*, 1974). None, however, had appeared on the west side where the water remained deeper. Dunes had formed against a pre-existing sand bank 60 metres east of the barrier and beaches had also built up on both the east and west sides of the barrier linking Burray and South Ronaldsay.

In the eighteenth century the Holme Sound and Water Sound were primary shipping routes. Strong currents formerly ran through the sounds and there was an anchorage and pier on Holme Sound Bay. The Churchill Barriers closed the channels and the sand carried by the current was deposited behind the barriers. The charts below show clearly how sand is being trapped by the barriers and natural features along the east coast. The process had already begun when the Admiralty sank blockships across the entrances in the First World War. Blocking the channels led to deposition in Widewall Harbour and Hunda Sound linking Hunda and Burray that were separate islands in 1812.

The construction of the barriers has also had an effect further afield. The sand that is collecting on the east side of the barriers formerly supplied beaches along the north side of Scapa Flow. These are now being denuded and archaeological sites along this coast are therefore under threat. This area should be monitored regularly, since new sites might be exposed. One such site was exposed on the coast below the Earl's Bu at Orphir. The exposed section was drawn in 1989 by a team from Durham University. Erosion here continues. On the other hand deposition along the coasts adjoining the Churchill barriers means that coastal archaeological sites here are protected, but perhaps also concealed. Research designs for future archaeological surveys in the area should take account of this.

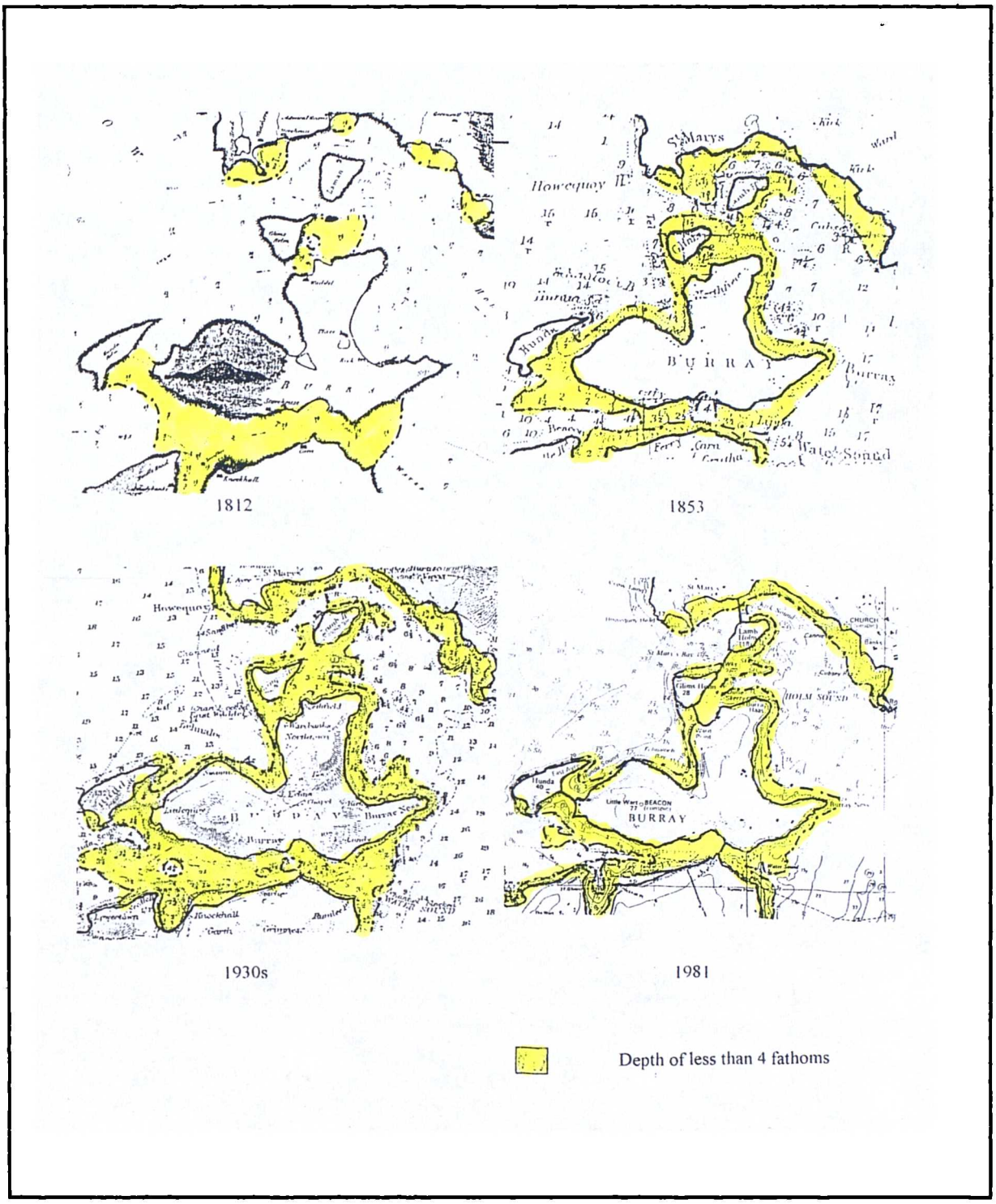


Figure 29 The eastern approaches to Scapa Flow from Admiralty chart of 1812, 1853, 1930s, 1975)

As with maps, charts are limited by the scale and accuracy with which they were initially drawn and subsequently revised. In many cases areas of known change appeared unchanged on charts that were still using old soundings. The green inter-tidal or "drying" areas shown on a modern chart map the extent of the active area of the shoreline; they depict areas of

shore platform, sand, shingle and other deposits exposed at low tide and indicate areas of deposition and the maximum extent of erosion of the surface till over bedrock in the last few hundred years. In areas where there is no shore platform depicted gauging the extent of coastal change must rely upon the other techniques outlined here.

3.2.3 Field Survey

In order to supplement and to test the existing evidence for coastal change, the present author undertook a field survey to identify eroding, accreting and stable areas of the coastline, based on their physical characteristics (3.2.1), and through a survey of local inhabitants. A sampling strategy was adopted, since it was not feasible to walk the entire coastline in the time available. Based on tidal stream patterns, prevailing wind directions and strengths, previous archaeological surveys and the evidence from maps and admiralty charts I identified areas and sites which were known to be eroding and areas which were likely to be either eroding or accreting.

The aim of the survey was fourfold - to locate new medieval sites, to assess the rate of erosion at known sites, and to walk areas of eroding coastline with no known medieval sites to test assumptions about the settlement distribution and patterns of coastal change. Ten medieval sites were visited to determine the extent of erosion damage since they were last recorded and ten 1 km control survey strips were walked to determine the stability of the coastline there and to look for new sites. I devised standard recording sheets (figures 31 and 32) to describe each area and also interviewed local inhabitants about the occurrence of storm damage, the movement of sediment and other changes to the coast.

Inevitably not all of the information gained from the questionnaires was accurate. Some people were clearly unaware of the extent of coastal change. Farmers, on the other hand may have exaggerated estimates of land loss in order to highlight the problem. There is an extensive literature on the use and abuse of opinion surveys and whilst this is clearly an important consideration in the gathering and analysis of such data, in this instance results from the questionnaire survey supported the information gathered from other sources. Information derived from the survey is included in the gazetteer entries in appendix 1. The original survey records have been sent to the Orkney Sites and Monuments Record.

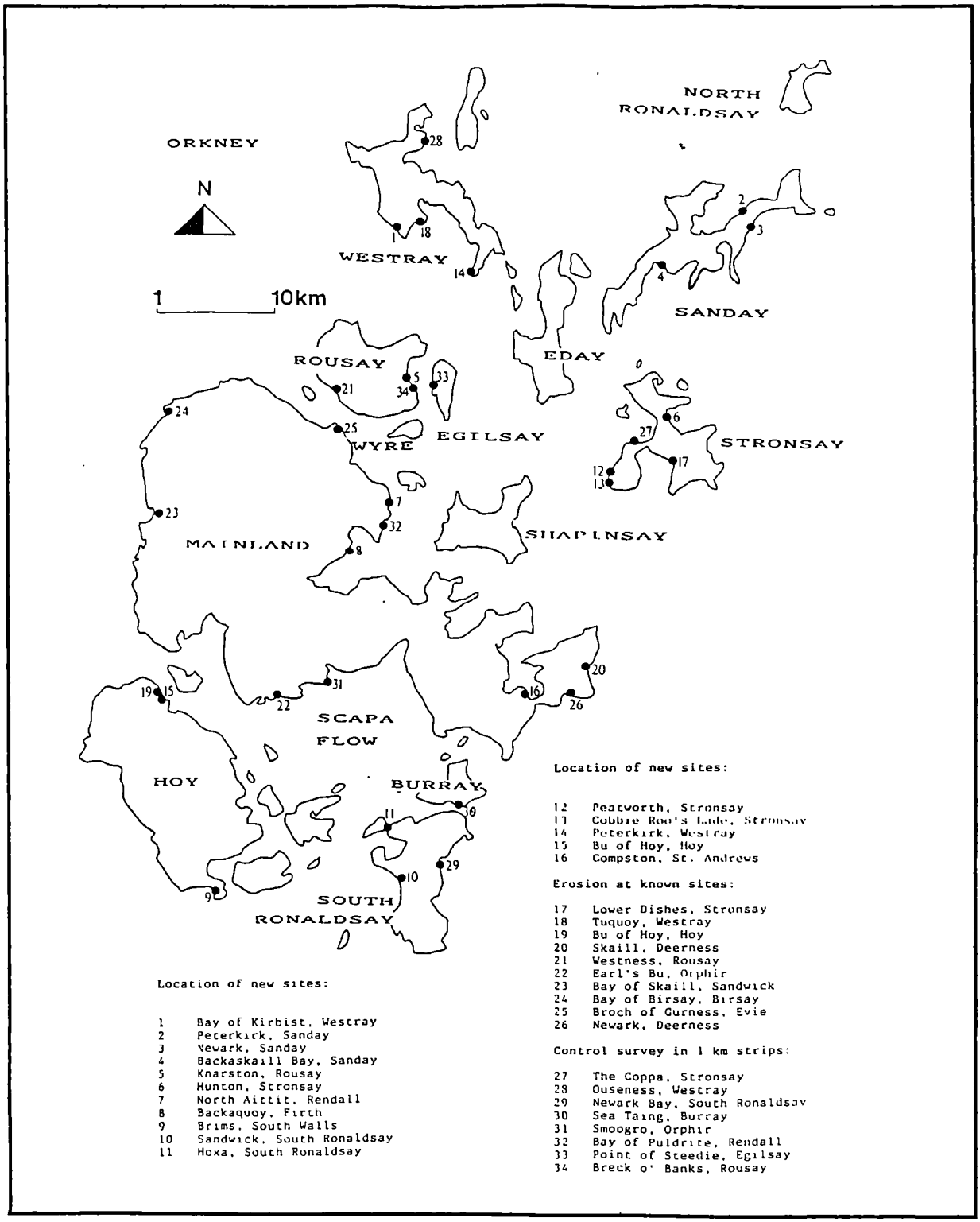


Figure 30 Sites surveyed

Field records

Information about the nature of the foreshore, cliff vegetation and an estimate of the erosion rate was collected to establish any links between these. Most beaches were composite with a veneer of boulders, sand and shingle over a rock platform. Storm beaches and soft sediments exposed in the cliff indicated high erosion. Where the shore platform dipped towards the sea the erosion rate was usually moderate or low and the rate was low also on boulder ayres and cliffed coasts.

Many of the sites that I visited were suffering from erosion to some degree. At Tuquoy, Westray (gaz. no. 021); Pool, Sanday (gaz. no. 001); Lower Dishes, Stronsay (gaz. no. 105); Saviskaill Bay, Rousay (gaz. no. 147); Backaskaill Bay, Sanday (gaz. no. 135) and the Bay of Skaill, Sandwick (gaz. no. 153) the archaeological sites are being damaged. At Westness, Rousay (gaz. no. 027); The Broch of Gurness, Evie (gaz. no. 047); Birsay Bay (gaz. no. 051); Orphir(gaz. no. 054); Newark (gaz. no. 095) and Skaill, Deerness (gaz. no. 039) the visible structures are not immediately under threat, but they will soon be so.

Questionnaire survey

The questionnaire survey produced accounts of the localised rate of change. There were reports of seasonal cyclical changes in the amount of sand at the Bay of Skaill, Sandwick, whilst at Rackwick Bay, Hoy the sand apparently disappears and returns every three years. Inhabitants estimated the rate of erosion in the previous one, five, ten and fifty years (table 6).

In almost all cases the erosion seemed to happen sporadically in storms annually or every two or five years. Farmers and landowners appeared much more aware of the rate of erosion than shopkeepers; they based their estimates on practical considerations such as the number of times they had moved fences away from the retreating cliff edge. No-one appeared to overly exaggerate the extent of erosion and in most cases the problem was considered to have escalated recently. One or two sceptics attributed the cause to the over-enthusiastic excavations of archaeologists!

ORKNEY FIELD SURVEY May/June 1993 - FIELD RECORDS

Site name: Feaworth, Stronsay Grid ref.: HY 606 221 Date visited: 30 May 1993

Cliff visibility:

1 Clean section - very good visibility ☐
2. Overhanging vegetation - obscured ☐
3. Solid stone - nothing visible ☐
4. Other (specify) Totally grassed over ☑

Weather:

Overcast ☐
Heavy rain ☐
Fine ☑
Sunny ☐

Cliff vegetation:

Grass ☑
Dune ☐
Arable ☐
Other (specify)

Foreshore:

Sand ☑
Shingle ☐
Boulders ☑
Rock ☐
Mud ☐

Geology Rousay flags Height of cliff (m) 10

Visible remains:

Dry stone structures ☑
Slab-lined drains ☐
Midden ☐
Mortar bonded walls ☐
Clay bonded walls ☐

Description of remains: Shore platform ✓

Two circular lowmounds of rounded beach boulders, maximum height 0·80m

② 6m W-E × 5·3m N-S diameter (southern mound)
① 4·6m W-E × 5m N-S (northern mound)

The site is adjacent to the only possible landing place on this stretch of coast where there is a deposit of sand on top of the shore platform. It is also adjacent to the only peat beds on the island.

Photographed?

Yes (Ref. nos.) ☑ B/W A2,3,4,5,6
No ☐

Drawn?

Yes (Ref. nos.) ☐
No ☑

Erosion rate estimate:

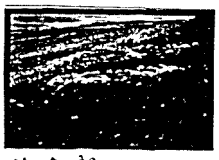
1. Soft sediment - high ☐
2. Storm beach on cliff - high ☐
3. Shelving rock - moderate ☐
4. Other (specify) none = deposition ✓

Other relevant information overleaf

Human interference:

1. Groynes
2. Sea wall or similar
3. Other (specify) none ✓
4. Sand/gravel extraction

Length of open coast (m) 2000m

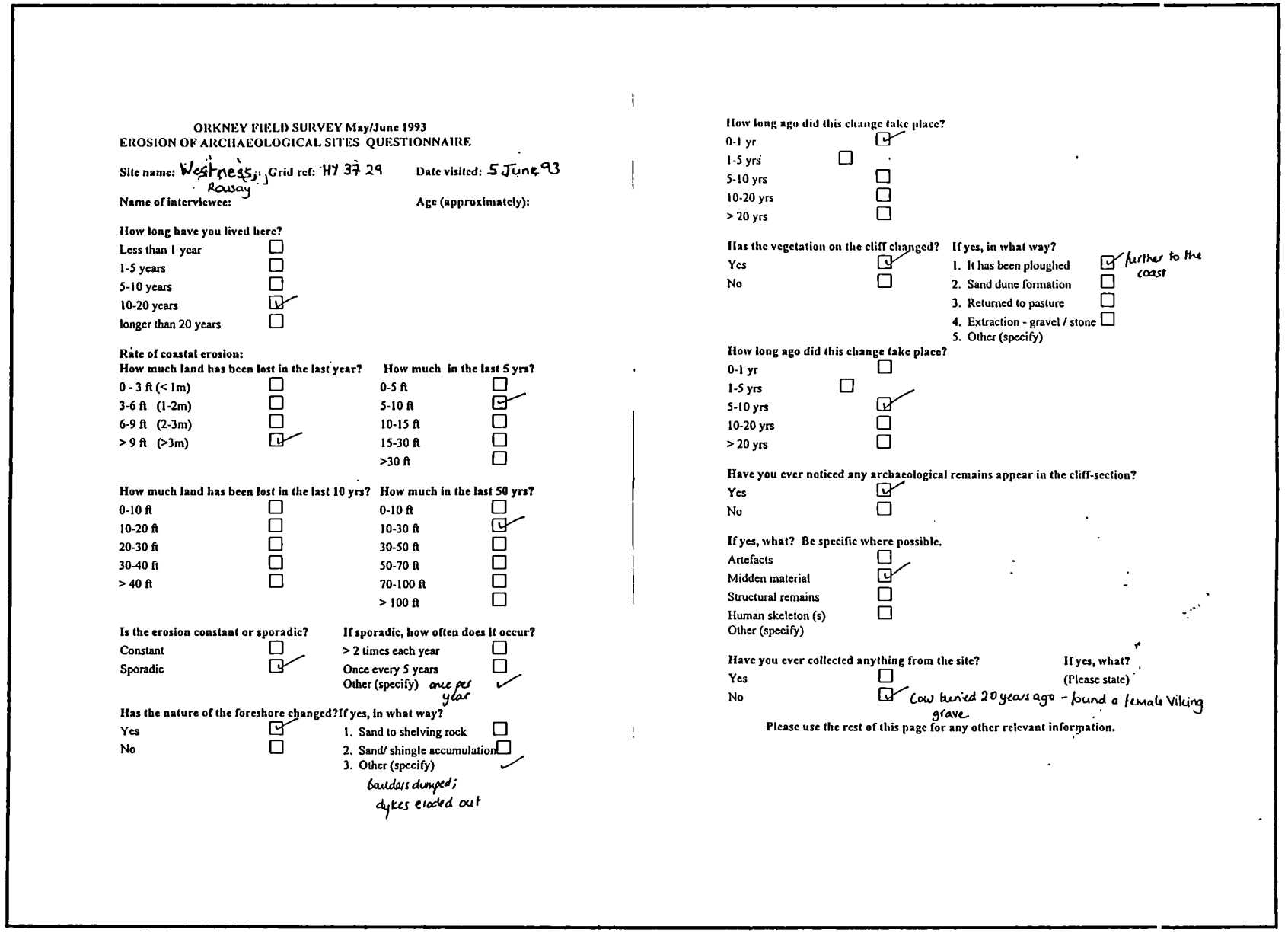


B/W A 3A

5A

Figure 31 Field survey record sheet

Figure 32 Erosion survey questionnaire



ORKNEY FIELD SURVEY May/June 1993
EROSION OF ARCHAEOLOGICAL SITES QUESTIONNAIRE

Site name: Westness, Rousay Grid ref: HY 37 29 Date visited: 5 June 93

Name of interviewee: Age (approximately):

How long have you lived here?

- Less than 1 year ☐
- 1-5 years ☐
- 5-10 years ☐
- 10-20 years ☑
- longer than 20 years ☐

Rate of coastal erosion:

How much land has been lost in the last year?		How much in the last 5 yrs?	
0 - 3 ft (< 1m)	☐	0-5 ft	☐
3-6 ft (1-2m)	☐	5-10 ft	☑
6-9 ft (2-3m)	☐	10-15 ft	☐
> 9 ft (>3m)	☑	15-30 ft	☐
		>30 ft	☐

How much land has been lost in the last 10 yrs?		How much in the last 50 yrs?	
0-10 ft	☐	0-10 ft	☐
10-20 ft	☐	10-30 ft	☑
20-30 ft	☐	30-50 ft	☐
30-40 ft	☐	50-70 ft	☐
> 40 ft	☐	70-100 ft	☐
		> 100 ft	☐

Is the erosion constant or sporadic?		If sporadic, how often does it occur?	
Constant	☐	> 2 times each year	☐
Sporadic	☑	Once every 5 years	☐
		Other (specify) once per year	✓

Has the nature of the foreshore changed?		If yes, in what way?	
Yes	☑	1. Sand to shelving rock	☐
No	☐	2. Sand/ shingle accumulation	☐
		3. Other (specify)	✓

boulders dumped; dykes eroded out

How long ago did this change take place?

- 0-1 yr ☑
- 1-5 yrs ☐
- 5-10 yrs ☐
- 10-20 yrs ☐
- > 20 yrs ☐

Has the vegetation on the cliff changed?		If yes, in what way?	
Yes	☑	1. It has been ploughed	☑ further to the coast
No	☐	2. Sand dune formation	☐
		3. Returned to pasture	☐
		4. Extraction - gravel / stone	☐
		5. Other (specify)	

How long ago did this change take place?

- 0-1 yr ☐
- 1-5 yrs ☐
- 5-10 yrs ☑
- 10-20 yrs ☐
- > 20 yrs ☐

Have you ever noticed any archaeological remains appear in the cliff-section?

- Yes ☑
- No ☐

If yes, what? Be specific where possible.

- Artefacts ☐
- Midden material ☑
- Structural remains ☐
- Human skeleton (s) ☐
- Other (specify)

Have you ever collected anything from the site?		If yes, what? (Please state)
Yes	☐	
No	☑	Cow buried 20 years ago - found a female Viking grave

Please use the rest of this page for any other relevant information.

Site	Rate (metres) 1 year	10 years	50 years
Lower Dishes, Stronsay	<1		10 - 15
Tuquoy, Westray	4		50
Bu of Hoy, Hoy	2 - 3	10 - 15	
Skaill, Deerness	<1		10
Westness, Rousay	>3		10
Earl's Bu, Orphir	<1	3	
Bay of Skaill, Sandwick	<1	>3	
Bay of Birsay, Birsay	1 - 2		>3
Broch of Gurness, Evie	<1	>2	
Newark, Deerness	1 - 2	>3	

At the other sites surveyed the rate of erosion was high at:
(NB. Sites in italics were 1 km survey strips. No medieval settlement was located here).

The Coppa, Stronsay	Backaquoy, Firth
Bay of Puldrite, Rendall	Hunton, Stronsay
Peterkirk, Sanday	Peterkirk, Westray
Backaskaill Bay, Sanday	Bay of Kirbist, Westray

Table 6 The recorded rate of erosion in study areas

3.2.4 The effect of climatic change: then and now

The period from about AD 800 to AD 1200 saw a climatic optimum in the northern hemisphere followed by a deterioration that led to the return of the Arctic ice around Greenland, blocking sea routes and eventually destroying the Norse colony there. The deterioration culminated in the "Little Ice Age" during the sixteenth, seventeenth and eighteenth centuries in Europe. The period of medieval warmth has been explained by a shift in the circum polar vortex towards the Pacific that experienced colder weather at this time (Lamb, HH, 1982). Other authorities consider the climatic changes which occurred in medieval times to be more complex (Whyte, 1985) though the basic model still stands (Morrison, 1991).

The implications of this climatic change on Orkney were many. In the Viking period the land probably supported more scrub birch woodland, conditions for farming were favourable and oats and barley probably grew more easily (Davidson & Jones, 1985). On

the other hand, sea levels were higher as a result of melted polar ice and the higher mean temperature. This was evident on the North Sea coast of England and Europe. There were extensive fenlands in East Anglia and on the Dutch and Belgian coast. In Orkney several headlands now linked by low sand bars may well have been insular or tidal at that time. The Deerness peninsula, Hunda, Burray and South Walls are just three examples. The Lochs of Stenness and Harray on the Mainland were probably a single loch, navigable from the sea. Greenvile Collin's chart published in 1692 depicted a single "Lough Stenness" accessed from the sea. It also showed two main harbours, one at Cairston, Stromness and the other at Deer Sound, between the Deerness peninsula and the parish of St. Andrews, thereby supporting the theory that the sound silted up more recently and that Deerness may have been insular formerly. Low lying coastal fringes would have flooded and become salt marshes. Some of this land may subsequently have eroded away.

In Orkney the wind is the dominant element of the weather (3.1.2). Past wind patterns are little understood. Research has concentrated on relative temperatures and wetness and no-one has studied Orkney in particular. Plotting the location of landing places adjacent to coastal settlement sites through time (figure 33) revealed a relative increase in settlement away from west facing coasts during the medieval period. The cause of this shift is unknown - it might equally be political, economic, social or climatic. It may reflect the movement of the earldom residence from Birsay to Kirkwall early in the eleventh century and also settlement expansion. The diagram shows the percentage of landing places exploited in medieval Orkney based on the gazetteer sites in appendix 1, excepting bordland territories that had many possible landing places and sites without occupation dates. Related sites such as the harbour at Pool Bay and the adjacent settlement counted as a single entry. Sites with access in two or more directions were counted in each relevant compass direction.

The diagram shows that settlements on the western seaboard were occupied throughout the medieval period, not going out of use until the fourteenth and fifteenth centuries. Gradually settlement expanded to occupy other shores also. Thus if climatic deterioration, associated with an increase in westerly storms, did occur in the late medieval period, it did not affect settlement patterns until the fourteenth century. Other factors would also affect settlement location. The shift away from the west coast reflects in part the movement of the Earldom residence from the Brough of Birsay to Kirkwall. Kirkwall is the natural centre of the island group with easy access to transport routes to the north and to the south via the portage to Scapa Bay. Birsay, on the other hand, is rather isolated on the western coast. Birsay Bay affords no shelter from westerly winds and is a difficult landing place even today. Although it is well-placed for traffic down the western seaboard, traffic taking the easterly route through the islands would by-pass it completely. The earldom residence was probably established on the Brough because it had been an important place

during the Pictish period. This association may have become less relevant with time and the Earl decided to move to the more easily accessible, sheltered and central site at Kirkwall.

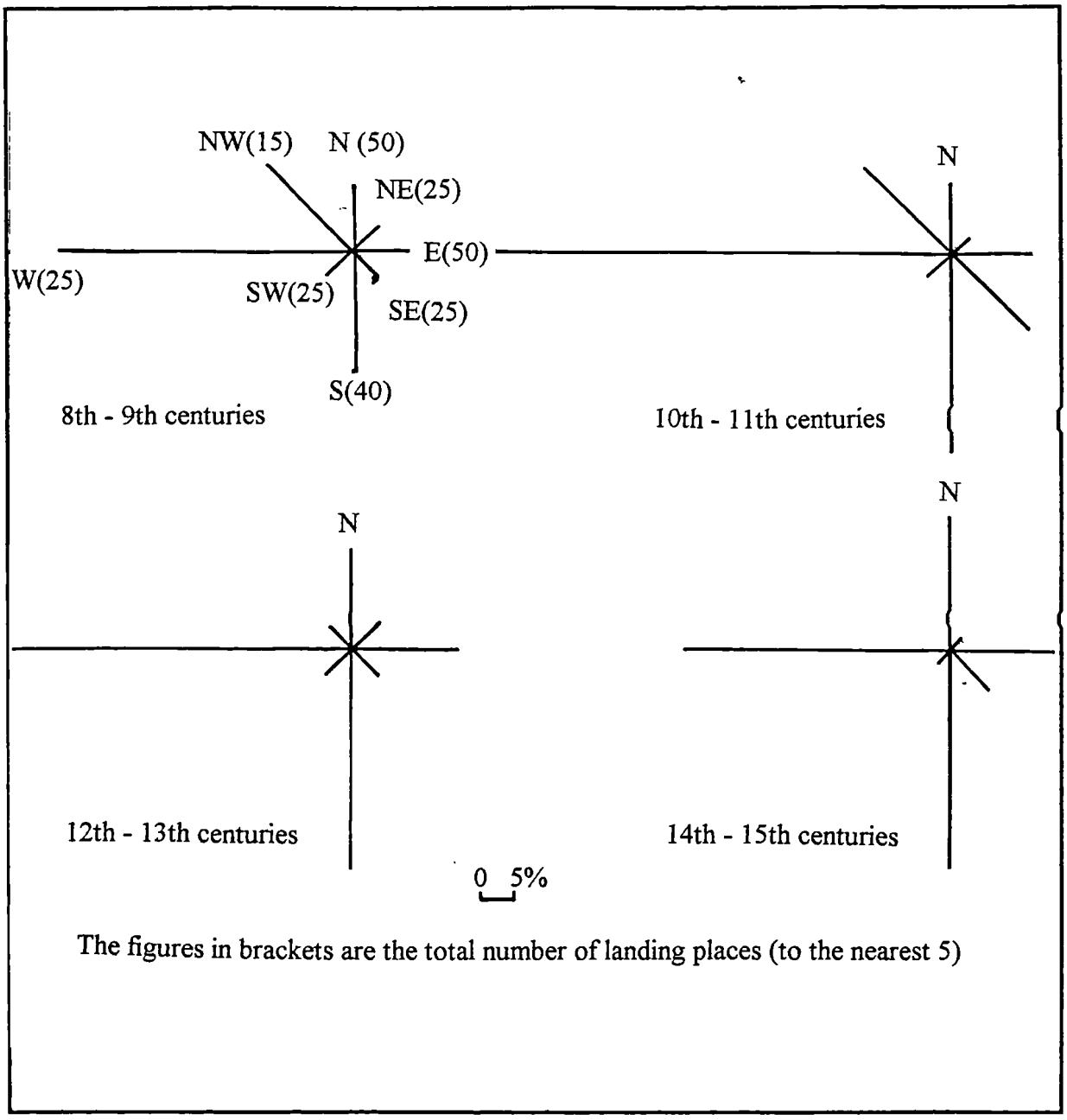


Figure 33 The percentage of landing places exploited in medieval Orkney

3.3 Topography

Ordnance survey maps and individual parish reports from the statistical accounts show that changes to the landscape, particularly those wrought by people, are by no means confined to the coastline. Pressure on land during the eighteenth and nineteenth centuries led to the draining of many lochs and improvement of marginal land for growing crops or grazing cattle. Whilst the sea is encroaching in many places, the land level is also rising through the accumulation of refuse, associated with occupation. Farm mounds have been formed as a result of farming processes both in antiquity and in the modern day.

It is important to be aware of and to understand the nature of these changes when prospecting for new medieval sites.

Land reclamation

The regular treeless landscape of square fields, arable land and crops in Orkney today is very different from its appearance in the medieval period. The land formerly supported a wider distribution of scrub birch woodland, evidenced in pollen sequences and wood charcoal from archaeological excavations (Davidson & Jones, 1985). In the eighteenth century arable land covered just a quarter of the area it does today (OSA, 1978). Much marginal land was drained in extensive reclamation projects in the nineteenth century, triggered by a sudden population increase coupled with a decline in the herring and whaling industries (Thomson, 1987). Government loans allowed wealthy land owners to develop their estates, and in the case of David Balfour, the whole island of Shapinsay. The field boundaries there still conform to the ten acre grid that he established. Similarly ambitious schemes were mounted by Fortesque of Swanbister, Orphir and Traill of Wyre (Thomson, 1985). The minister's report from Sanday in 1841 recorded the draining of land in the parish of Cross and Burness; Loch Tuquoy, Westray was also drained about that time.

The process continued through the last century. During World War II 600 acres of derelict land was reclaimed for farming in Quanterness, Mainland involving the use of huge mechanical drainers. One hundred and seven acres were apparently recovered in Holm, Mainland between 1948 and 1953 (Miller [ed.], 1985, 156). Many of these changes appear on maps of the Ordnance Survey and earlier Admiralty charts. Many lochs that existed at the beginning of this century are now gone. On the other hand some areas noted only as areas "liable to flood" on the Ordnance Survey maps of 1901 are now lochs (table 7).

Place	Grid reference	Loch drained	Loch formed
Aikerness, Westray	HY4452		X
Windywalls, Westray	HY4551	X	
Savoy, Papa Westray	HY4851	X	
Maeback, Papa Westray	HY4952	X	
Garsow, North Ronaldsay	HY7554	X	
Dale, Westray	HY4247	X	
Tuquoy, Westray	HY4443	X	
Bride's Loch, North Ronaldsay	HY7652		X
Noup, North Ronaldsay	HY4148	X	
Monivey, Westray	HY4048		X
Garth, Westray	HY4645	X	
Ouse, Sanday	HY6639	X	
Quoys, Stronsay	HY6129	X	
Maeness, Egilsay	HY4730	X	
Oorns, Rousay	HY4526	X	

Table 7 Some of the drainage changes in Orkney in the last century

It is beyond the scope of the present work to do more than draw attention to the significant changes to Orkney's topography in the thousand years following the first Viking settlement of the islands. Individual excavation projects provide a more detailed picture of the local environment of medieval sites. Hunter (1990), for example, noted the considerable change in the topography of the island of Sanday as a result both of modern drainage and shifting sands, although coastal erosion aside the site at Pool was relatively unchanged. A pollen core was taken from the drained Loch of Tuquoy, adjacent to the Viking and Norse settlement site on Westray. The results of the analysis are not yet fully published but coring with a bucket auger detected the course of the stream bed that ran from the Loch to the sea and which must have supplied the settlement (Owen, 1988; 1993). In addition bout forty metres of land had been lost to the sea at this point within living memory, so the environment of this site has changed markedly.

Drainage patterns, blown sand, tree cover and farm mounds, the latter created by a combination of anthropogenic and natural factors (2.1.10) are the most commonly changing elements of the islands' topography. Farming and habitation today continue to increase the

height of the land through the accumulation of waste whilst desiccation and wind erosion of sand cause deflation in some areas.

Summary - Monitoring the change

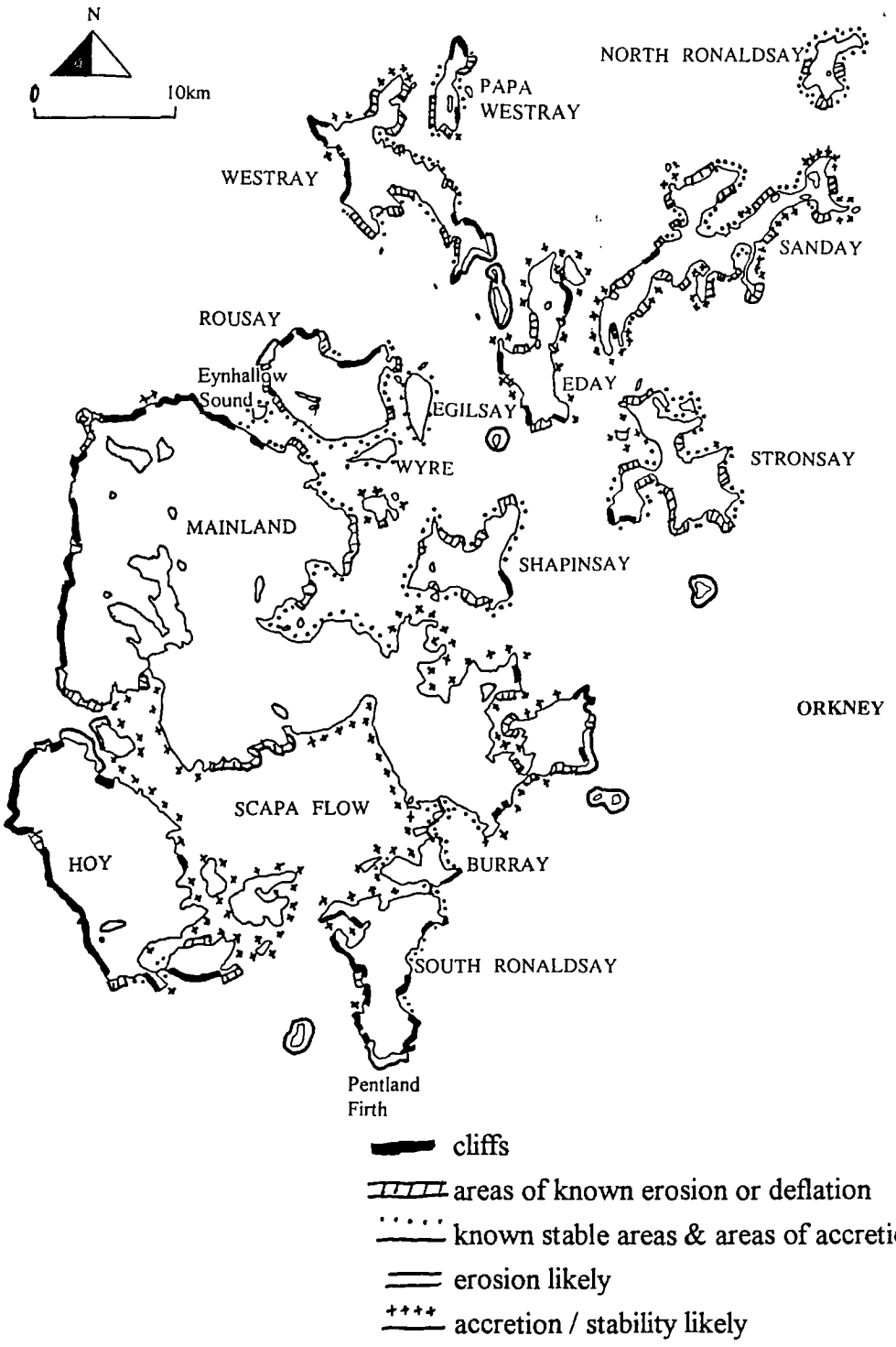
The foregoing discussion has demonstrated that whilst much information exists about coastal change today and in the last couple of centuries, we are still a long way from reconstructing the medieval coastline. Predicting the location of the coastline on the basis of a handful of excavations and modern trends is fraught with difficulties due to the complex inter-relationships of the underlying causes, but it is evident from this study that the construction of barriers, piers and harbours has had a profound effect on current patterns, silting and even shipping channels.

The results of the erosion questionnaire survey, together with field measurements that are now being collected by the Orkney Islands Council provide an estimate of the annual loss. Simply projecting the annual rate of loss back through time, however, is not feasible since large-scale erosion is probably a relatively recent phenomenon exacerbated by global warming (Morrison, 1991). The worst damage occurs sporadically in freak storms that are difficult to predict, and against which there is, in any case, little protection.

The location of the medieval coastline may be more accurately gauged by estimating rates of change in the last hundred years and comparing this to the coverage of the inter-tidal zone depicted on Admiralty charts, together with information gleaned through excavation. On a small scale map the changes, in the order of 50 to 100 metres, would not be very obvious. This estimate assumes a higher sea level in the Viking and Norse periods to offset some of the modern erosion. For the most part gauging the change at any one place remains intuitive, based on an evaluation of local coastal morphology, exposure, tidal streams, man-made or other obstructions and local knowledge.

Coastal change and management strategies

Current patterns of coastal change around the islands are summarised in figure 34. Cliffed coasts are omitted since few data were available on their condition. They can be assumed to be relatively stable. Estimates of the rate of erosion at individual sites appear in the gazetteer in appendix 1.



Based on field survey, questionnaire survey, Orkney SMR, tidal patterns, exposure of coasts, underlying geology, surface till, Ordnance Survey maps, Admiralty charts and Mather *et al*, 1974

Figure 34 Coastal change in Orkney today

Many archaeological sites are currently being destroyed, or are under threat of destruction through erosion. The sites are too numerous to protect by sea walls. Protection is an expensive business, but so too are excavation and survey. In December 1993 Historic Scotland produced a discussion document considering the scale of coastal erosion in Scotland, its impact on the archaeology, the cost of protection and alternative management strategies (Ashmore, 1993). A similar study, involving extensive fieldwork, was recently carried out in Northumberland (Northumberland County Council, 1994).

In terms of cost efficiency Ashmore favoured protection over excavation estimating that protecting and maintaining a 100m section of coastline might cost £40,000 over twenty years, whereas full scale excavation would cost £200,000. Instituting a policy of "managed retreat" (allowing nature to take its natural course and selecting important sites for study in advance of their destruction) has several drawbacks. Prioritising sites of which some 30% are "opaque", i.e. undatable without limited excavation or sampling is impossible. More importantly a protection programme would result in no new information. Ashmore proposed a compromise: that some (small) sites should be excavated, taking into consideration the value (in monetary terms) of the knowledge thereby obtained.

Ashmore's proposal fails on at least one crucial point; the construction of sea walls and the extraction of sand to replenish denuded beaches simply moves the problem further along the coast and additional sites will come under threat. The sea walls constructed at the Neolithic settlements at Skara Brae, Sandwick and Knap of Howar, Papa Westray prove the point; areas of midden and structures outside the limits of the concrete walls are now severely eroded. If a protection policy using "hard" defences is adopted then ideally the defences must extend the length of the exposed "soft" coast, and not just the focus of the archaeological site. Soft defences such as the introduction of new sand should come from inland sources, rather than neighbouring coasts. Even here extraction might create blow outs and severe wind erosion. The stabilisation of sand areas with vegetation cover is preferable.

Whatever system is adopted it is imperative that coastal surveys are conducted to monitor changes. Remote sensed satellite data are capable of producing accurate maps of the coastline which should help to determine the rate of change and further research into its underlying causes such as exposure, sediment levels and local development.

Inevitably any management strategy for coastal archaeology will require updating as new information and new archaeological sites are uncovered. Nevertheless, it is essential that a strategy is formulated, based on existing evidence, to predict and monitor coastal change and its affect on coastal archaeology, rather than merely to react to events. Planners should learn from the case of the Viking boat burial excavated in 1991 on Sanday, following its chance discovery by an archaeologist. The site had already lain exposed for several

months and half of the boat and its contents had been lost to the sea before excavation began. The area had not been visited by an archaeologist for ten years. If a strategy for coastal monitoring is implemented, hopefully, next time such sites will be substantially more complete.

CHAPTER 4 Arguing the case for a marine-based subsistence economy

Introduction

The aim of this chapter is to assess the extent to which people in medieval Orkney depended upon marine resources in their diet, and additionally to meet their basic needs of shelter, fuel, clothing and tools. Previous discussions of the subsistence economy in Viking and late Norse Orkney have referred to the contribution of the various and plentiful seaware (Morris, 1985; Kaland, 1982; Hunter, 1986), but each of these authors considered it to be merely a supplement to a principally agrarian economy, in contrast to the situation in Shetland (Bigelow, 1992). Indeed on several occasions authors have drawn attention to this apparent distinction between Orkney and Shetland: that the traditional perception of a Shetlander was of a fisherman who also farmed, whereas an Orcadian was a crofter who occasionally fished (Morris *et al*, 1989, 6; Hunter, 1986b, 72). The distinction between recent Orcadian and Shetland economies is explained by the different land capabilities and geology of the two island groups. Shetland is more mountainous with much less cultivable land. The best land was limited to the coastal strip, whereas Orkney has good grazing and arable land on almost every island. To argue on the basis of recent analogy is tempting when faced with a dearth of direct evidence, and I do so myself, but it is possible in this case to cite a recent tradition that puts the contrary view - that Birsay (a parish on Mainland Orkney with good agricultural land) folk were also fishermen first and farmers second (Morris *et al*, 1989, 6).

That fish and shellfish were used as a source of food or bait in the Viking and Late Norse periods is likely. Both are present in the site assemblages. The uses to which seaweed, driftwood, pumice, seabirds, seals, whales and even sand might have been put are perhaps less obvious. Although remains of all of these are present on medieval sites in Orkney they occur only in small quantities, and are therefore generally assumed to have been of little significance to the subsistence economy as a whole. It is my belief, however, that the marine resources exploited in the past are grossly under-represented in the archaeological record in a way in which other faunal remains are not. This is in part a result of their fragility, original disposal patterns and because scientific excavation and recovery procedures were only introduced relatively recently. In addition excavation concentrated on settlement sites and not on other types of coastal site or the middens associated with these sites. The latter sites exist; at Freswick, Caithness there is evidence for an intensive Norse fishery (Batey, 1992b). I argue here that the economy in medieval Orkney was, like Shetland, heavily marine-based, although much of the evidence discussed below is necessarily negative, based on the absence rather than the presence of material, due to the paucity of published excavations. Demonstrating that large quantities of fish and shellfish

were exploited does not prove their economic dominance over terrestrial agricultural resources. Indeed it would be impossible to prove this point based on the archaeological evidence currently available. This thesis does, however, demonstrate the importance of marine resources in terms of their high calorific yields / weight and the relative ease of their acquisition compared with sowing and harvesting crops, milking cows, clipping sheep and so on. Many marine resources, small fish, shellfish, whales and seals could be collected from the beach.

The following discussion focuses on the evidence of ten archaeological sites: The Brough of Birsay, Saevar Howe, Buckquoy, Red Craig, Beachview and South of Red Craig, all in Birsay Bay, and Pool, Tuquoy, Orphir and the Brough of Deerness. These were selected because they are the only sites for which there are comprehensive specialist reports of the faunal assemblages. This is not ideal since the sites vary in status, longevity and in the extent to which they have been excavated and published.

The Brough of Birsay (gaz. nos. 051, 052, 053) served as the earldom residence from the ninth century. Settlement there succeeded Pictish occupation. The site comprised a chapel with a graveyard, a series of dwelling houses, halls and industrial buildings. Excavation over several years by Cruden (1965), Hunter and Morris (1981 & 1982; Hunter, 1983a & 1986; Morris, forthcoming) demonstrated that the settlement was dependent upon a hinterland that supplied butchered beef, although sheep, pigs and perhaps a small dairy herd lived on the Brough itself where black oats and barley also grew. Several sites in this hinterland, the neighbouring Bay of Birsay, have also been excavated: farmsteads at Buckquoy (Ritchie, 1977; gaz. nos. 049, 050), Saevar Howe (Hedges, 1983; gaz. nos. 058, 059), and three sites near Red Craig, excavated by Morris *et al* (1989), Areas 1 (gaz. no. 56) and 2 (gaz. no. 060) to the south and Area 3 at Red Craig (gaz. no. 093). Settlement at all of these sites also spanned the so-called Pictish/Viking interface and ended about the same time as the Brough apparently went out of use. No-one has yet analysed the evidence for interaction between these sites, although this is the most intensively studied geographical area of Orkney.

Excavation at Buckquoy, a natural mound known locally as Sinclair's Brae, revealed a series of superimposed farmsteads with five phases of occupation. The sea had destroyed a considerable portion of the site. The first Norse occupation (phase III) was represented only by a byre, the second phase (IV) by a barn and the third (V) by a dwelling house, but no ancillary buildings. The environmental assemblage came from these buildings, and although the byre contained a midden that had accumulated after its abandonment, the excavator found no other midden horizons or complete middens.

James Farrer first explored the Pictish and Viking settlement at Saevar Howe in 1862 and 1867, when he uncovered a long cist cemetery. Re-evaluation and re-excavation in

1977 by J.W. Hedges showed that the cemetery was Viking, rather than Pictish in date, and that Farrer had cut through a Viking settlement comprising three superimposed hall-houses. Small areas of midden, each measuring no more than a square metre, lay within the buildings in each phase. The trial trenching did not completely reveal any of the buildings; the total excavated area was only about $100m^2$. Farrer had reported finding a large midden in 1867 and a surviving part of this was re-located outside one of the buildings. It belonged to Phase IIa, the earliest Norse settlement (Hedges, 1983, 82). The environmental assemblage discussed below is therefore only a fraction of that belonging to the site.

In contrast to the rectangular and typically Norse period buildings as Buckquoy and Saevar Howe (see discussion in chapter 2 on building types) the building at Red Craig, Area 3 had an elliptical exterior, substantially intact, with an internal figure-of-eight shape and a corbelled rather than timber roof. A second ancillary building, perhaps linked to the first by a paved yard lay to the South. The environmental assemblage came entirely from within the figure-of-eight shaped building. There appeared to be no surviving associated middens (Morris *et al*, 1989, 285).

Although excavated and recorded separately, areas 1 and 2 South of Red Craig formed part of the same site, itself not completely excavated. Occupation debris, middens and areas of stone flagging indicated that these were the fringe of a settlement site, although there were no definite building remains. The environmental assemblages from these two areas are of particular interest in representing an area outside, but associated with, a settlement focus. Since the two assemblages belong to the same site I consider them together.

The seventh case-study, the Brough of Deerness, a chapel and settlement, lies off the east coast of Deerness, Mainland. The site is superficially similar in appearance to the Brough of Birsay. It is not clear whether the Brough of Deerness (gaz. no. 040; 144; 145) was a monastery or a secular site. The foundations of over thirty rectangular buildings are visible, but only the chapel and graveyard have been excavated (Morris with Emery, 1986). It is possible that the environmental assemblage was in part intrusive and/or derived from later phases (Rackham, 1986). For that reason, whilst I outline the range of species found there, the site does not appear in the quantified analyses in the latter half of this chapter.

Tuquoy, Westray (gaz. no. 27) is the site of a Late Norse hall, possibly to be associated with the family Halflidi which is recorded in the *Orkneyinga Saga*. Following storm damage to the site which is exposed along a hundred metre stretch of coastline, Olwyn Owen conducted excavations in 1982, 1983, 1988 and 1993. The project at Tuquoy was arranged and funded by Historic Scotland. Post-excavation work is still in progress, Olwyn Owen has kindly made available reports on the environmental assemblages prepared to date. The final publication of the site may well offer material that will substantially

change the conclusions offered in this chapter. In 1982 and 1983 excavation focussed on the buildings exposed in the cliff section. In 1988 coring up to fifty metres inland established the likely extent of the site. Preservation on the site varied. In 1988 a waterlogged pit containing rich organic deposits was found. The phasing of the site is currently under review. That outlined in the gazetteer is based on results from the first three seasons only.

The final report of the multi-period settlement excavated at Pool. Sanday (gaz. no. 001) is still in preparation (Hunter *et al*, forthcoming). Data cited in this chapter is drawn from specialist reports on the site which are already complete (Serjeantson & Bond, forthcoming; Nicholson, forthcoming), from a doctoral thesis based on the site (Bond, 1994) and the draft text of the excavation report (Hunter *et al*, forthcoming). Eight phases of occupation at the site spanned the Neolithic to the Viking periods. The Viking and Norse phases 7 and 8 were marked by a reorganisation of the site involving the construction of a rectangular stone building with an internal area of 72m^2. Benches were positioned against the two longer internal walls, and spreads of material from a central hearth. This structure, evidently a dwelling house, had, however, no indication of roof construction. The faunal assemblage discussed here derived from deposits within and outside this structure. Lying very close to the present day land surface, the archaeological deposits had been damaged by ploughing and the majority of material therefore came from the so-called interface phase 7. The assemblage during this phase was characterised by the introduction of steatite, the first evidence for flax cultivation and artefacts of Scandinavian origin. Bond (1994) concluded from the environmental assemblages that the subsistence economy was broad-based mixed farming with some hunting and fishing. She noted an intensification in both ceareal production and dairying in the Viking period when the numbers of fish also increased, perhaps reflecting a change in fishing techniques.

Excavations adjacent to the Earl's Bu (gaz. no. 054), associated with the residence of the Earls of Orkney which is mentioned in the *Orkneyinga Saga*, have revealed evidence of Late Norse settlement and a Norse mill (gaz. no. 099). The mill structure, comprising a drystone underhouse, lade and tail-race, was overlain by midden deposits dating from the tenth to fourteenth centuries. Reports on the faunal assemblages from excavations in 1979 - 1986 and 1988 have been compiled (Mainland, 1993; 1994), though reports on the bird, fish and molluscan remains are not yet complete (Morris, pers. comm.). The assemblage was collected through extensive on-site sieving using a 4mm mesh. The animal bone was very fragmented but well-preserved (Mainland, 1993).

A figure-of-eight shaped house was uncovered at the Beachview 'studio site' (Area 1; sub-areas D & E) in Birsay Bay in advance of development. Radio-carbon analysis dated the remains to c. AD 1000-1300. The final report on the excavations is in preparation. Preliminary results show that most fish remains came from midden contexts and layers which

were wet-sieved. A variety of mesh sizes was used in the flotation of samples on the site, ranging from 0.5 to 2mm.

Ten sites is, of course, a very small sample of the total number of known sites in Orkney and six of them cluster in a single area. The final publication of the recent excavations at Westness, Rousay; Tuquoy, Westray; Pool, Sanday; Beachview, Birsay and further excavations at the Brough of Birsay and in Birsay Bay by Christopher Morris may well offer material that will substantially alter the conclusions offered here (Morris (ed.), forthcoming).

The subject of the first part of the chapter is the range and accessibility of marine resources that were naturally available and the evidence for their exploitation at the nine sites. In 4.2 I outline the taphonomic processes that cause under-representation in marine environmental assemblages. Finally, I suggest alternative quantification techniques, recovery methods and excavation strategies which could more accurately reflect the extent to which marine life was exploited in the past.

Assessing the comparative importance of different elements of an environmental assemblage is a problem common to all archaeological sites. The quantity of bones recovered from each species is not directly related to the economic importance of that species. This is usually assessed by calculating the calorific yield or meat quantity which those bones represent (Rowley-Conwy, 1983). This in turn requires an assessment of butchery practices to determine how much of each carcass was used (Lyman, 1982). The results of such techniques are only valid where a representative sample of bones from an exploited species has become incorporated into the archaeological record. This is probably rarely the case. For example, it is recognised that bird bones, apart from domestic fowl, generally comprise a tiny fraction of the total faunal assemblage, and this hinders interpretation of their significance (Hamilton-Dyer, 1991).

Calculating the relative contribution of meat, cereals and vegetables in the diet is equally complex (Hastorf & Popper, 1989). In the last fifteen years research has concentrated upon reconstructing palaeo-diet by chemical analysis of trace elements in human skeletal remains. The ratios of strontium to calcium and isotopes of nitrogen and carbon can reveal to what extent diet was marine or terrestrial-based, and plant or meat-based (White, 1991). People eating primarily marine resources should have higher ^{15}N / ^{14}N ratios and lower strontium and calcium in their bone collagen than those eating meat and plants. Recent studies, now suggest, however, that the burial environment can also affect the levels of these trace elements remaining in bones (Heaton, THE, 1986).

4.1 The marine environment potential and evidence for its exploitation

The range of marine life nine hundred years ago was much as it is today. Change in both the climate and coastal morphology of Orkney since medieval times have affected the geographical distribution of fish, sea mammal and bird species only slightly and there is little evidence to suggest that their behaviour patterns have changed (Jones & Wheeler, 1989), although a few species, such as the Great Auk, *Pinguinus impennis*, have become extinct.

Taking into account coastal change since the Late Norse period, the majority of settlements at that time were located only thirty or forty minutes walking distance of the shore. People at most sites exploited both beach and offshore resources. The distinction between the two is difficult to discern archaeologically, and the two are here classed together as *marine resources*. It may be possible in the future to quantify the relative importance of the two. In view of the paucity of published environmental reports, this is not currently possible. It is, however, clear that a wide range of marine resources was exploited: fish, shellfish, crustaceans and barnacles, seals, whales and other cetaceans, seabirds, driftwood, sand, shingle, seaweed and otters.

4.1.1 Fishes

The diversity of Orkney's coastal morphology where cliffs and rocky shores merge into sandy beaches and where shallow bays open into deep sounds with fast running tidal streams (chapter 3) provides for a great variety of fish. In the nineteenth and early twentieth centuries Orkney had a commercial herring fishery with smaller cod and lobster fisheries from the eighteenth century, but people have exploited marine resources since the islands were first settled. At the neolithic settlements of the Knap of Howar on Papa Westray and Skara Brae in the parish of Sandwick (Ritchie, 1985) this exploitation included freshwater, inshore and deep-water fishing. This probably involved a combination of net and line fishing.

Cod, *Gadus morhua*, and two other members of the gadoid group: ling, *Molva molva*, and saithe, *Pollachius virens*, occurred most frequently in the medieval archaeological assemblages (Table 8). Today, saithe are common close inshore and in rock pools. Saithe over two years old, cod and ling live between two and five miles out to sea. Other offshore species eaten in medieval Orkney were pollack, *Pollachius pollachius*; haddock, *Melanogrammus aeglefinus*; hake, *Merluccius merluccius*; torsk, *Brosme brosme*; mackerel, *Scomber scombrus* and bottom-loving flatfishes such as plaice, *Pleurenectes platessa* and flounder, *Platichthys flesus*.

Species found close inshore and sometimes in tidal pools included ballan wrasse, *Labrus bergylta*; rockling, *Gaidropsarus mediterraneus*; sea scorpion, *Taurulus bubalis*; bull-routs, *Hyoxocephalus scorpius* and other small cotids. The cartilaginous fishes - shark,

rays and dogfish, occurred inshore together with eels, *Anguilla anguilla* and *Conger conger*; gurnards, *Eutrigla sp.* and red sea bream, *Pagellus bogarevo*. Anadromous fish, salmon and trout, *Salmo salar* and *Salmo trutta*, which live in both freshwater and sea water at various stages in their life-cycle, were occasionally present. The occurrence of tuna at Pool is most unusual (Barrett, pers. comm.).

The different habitats of the various species caught indicates the practice of a number of fishing techniques. Colley (1989) referred to two techniques used in Orkney in the recent historical period. These were known locally as "craig" and "eela" fishing. Fenton (1978) described the two techniques. "Craig" fishing involved the use either of a circular "poke" net or a conventional fishing rod, line and baited hooks from the shore, whilst "eela" fishing was similar, but was carried out from boats rowed close inshore. People may have caught fish by hand, by "tickling" them, by stunning them with stones, simply snatching them from the water, or by using harpoons and spears. People have devised many ingenious techniques to catch fish - including poisoning them and using trained birds to collect them (Jones & Wheeler, 1989). Wickerwork traps and nets set across rivers or on beaches and enhanced rock pools would make effective traps as the tide retreated (see chapter 2).

The determination of fishing practices from the fish bones themselves is difficult but there is other archaeological and linguistic evidence. Kaland (1982) cited place-name evidence for the use of handnets at Mervar on Stronsay; a name derived from the Old Norse term *merdver*. That fishing was carried out from boats is evident - a small fishing boat was found in a ninth-century boat burial at Westness, Rousay (Chapter 6; fig 60). The gunwale of the boat was fitted with an antler chafing piece clearly worn by a fishing line that must have run over the side of the boat. Net weights and line sinkers turn up on several sites, although their identification as such is sometimes tentative. The use of handlines with baited hooks seems likely and Colley (1989) suggested that flatfish found on sites in Birsay Bay were speared in shallow waters, whilst a wooden gorge, of a recent type known in Shetland, may have been used to catch other fish.

Butchery marks on the fish bones provide evidence for fish processing. At the Viking settlement at Saevar Howe the fish had been sliced down the middle and their heads chopped off. Traditionally fish treated in this way were preserved by being wind-dried or soaked in brine and then dried (Colley, 1983a). This was not the case at Tuquoy, where cut marks were consistent with gutting and filleting (Colley, 1988).

Species	BB	BU	SRC	RC3	BD	SH	TU	WE	BE	OR*	PO	EB
Bottom-feeding												
Shark /ray	X	X	X	-	-	-	X	?	X	X	X	
Turbot	-	-	-	-	-	-	-	?	-	?	X	?
Tuna	-	-	-	-	-	-	-	?	-	-	X	?
Anglar fish	-	-	-	-	-	-	-	?	X	?	X	?
Flatfish		-	-	X	-	-	X	?	X	X	X	?
Flounder	-	-	X	-	-	-	X	?	?	?	X	
Plaice		-	-	X	-	-	X	?	X	?	X	?
Inshore												
Dogfish	-	-	X	-	-	-	X	?	X	X	-	?
Eel		-	-	-	X	-	X	?	X	X	-	?
Conger eel	-	X	X	-	X	X	X	?	X	?	X	
Cod		X	X	X	X	X	X	?	X	X	X	X
Pollack		-	-	X	X	-	X	?	X	X	X	X
Saithe		X	X	X	X	X	X	?	X	X	X	X
Haddock	-	X	X	-	-	-	X	?	X	X	X	
Ling		X	X	X	-	X	X	?	X	-	X	?
Hake		-	-	X	-	-	X	?	X	-	X	?
Torsk		-	-	X	-	-	-	?	X	-	X	?
Rockling	X	-	X	-	-	X	X	?	X	?	X	
Sea bream	-	X	X	-	-	X	X	?	-	-	X	
Wrasse	-	X	X	X	X	X	X	?	X	-	X	
Mackerel	-	X	-	-	-	-	-	?	-	?	-	
Gurnard	X	-X	X	-	-	-	-	?	X	?	-	
Bull-rout	-	-	X	-	X	-	X	?	X	?	-	
Sea scorpion	X	-	X	-	-	-	X	?	-	?	-	
Cottid	-	-	-	X	-	-	X	?	X	?	-	?
River												
Salmon/Trout	-	X	X	-	-	X	-	?	X	?	-	

Table 8 Species of fish recovered from medieval sites in Orkney

BB Brough of Birsay (51); BU Buckquoy (50); SRC South of Red Craig, Birsay Bay, Areas 1 & 2 (56; 60); RC3 Red Craig, Birsay Bay, Area 3 (93); BD Brough of Deerness (40); SH Saevar Howe (59); TU Tuquoy (21); WE Westness (27); BE Beachview (86); OR Norse Mill, Orphir (99); PO Pool, Sanday (1); EB Earl's Bu (54)

* Preliminary information (Barrett, pers. comm.)

4.1.2 Shellfish

Marine mollusc shells occur commonly on most sites in Orkney (Table 9), and although species such as *Rissoa* sp. and *Cingula* sp. might be present as a natural component of shell sand, there is no doubt that people actively collected the majority (Rackham, 1989).

The most commonly occurring species are the common limpet, *Patella vulgata*, the periwinkle, *Littorina littorea* and the flat winkle, *Littorina littoralis*, followed by dog whelks, *Nucella lapillus*, and top shells, *gibbula cineraria* and *calliostoma zizuphinum*. Both limpets and periwinkles occur on rocky shores whilst flat winkles attach themselves to seaweed. Rackham (*op. cit., 260*) suggested that they arrived on sites with seaweed rather than being actively collected either for food or fish bait. Historically, limpets and mussels, *Mytilus edulis*, were used in Orkney to bait lines to catch saithe.

In addition to the sites listed in table 9, shellfish occurred in midden deposits at Kirkwall (gaz. no. 169), the Bu of Hoy (gaz. no. 116), Peterkirk, Westray (gaz. no. 111), Beachview, Birsay (gaz. no. 086), King's Craig and Whitehowe, Papa Westray (gaz. nos. 016 and 017), but the species have not been identified. Shellfish also occurred at Orphir in relatively small quantities.

4.1.3 Marine crustaceans and barnacles

Only a few fragments of crab shell and none of lobster occur on excavated sites. At the Brough of Deerness these probably represented birds' prey, rather than human refuse (Rackham, 1989). A single claw fragment was found at Buckquoy, and a handful of shell fragments was found over several phases of the site in Area 2 South of Red Craig. Barnacles were similarly rare and, like flat winkles, may have been accidentally collected with seaweed.

Species	BB	BU	SRC	RC3	BD	SH	ST	TU	BE	EB
Limpet	X	X	X	X	X	X	X	X	X	?
Periwinkle	?	X	X	X	X	X	?	X	X	?
Flat winkle	?	X	X	X	X	X	?	X	X	?
Grey top	?	X	X	X	-	-	?	-	?	?
Top shell	?	-	-	-	X	X	?	X	?	?
Common top shell	?	-	-	-	-	X	?	X	?	?
Dog whelk	?	X	X	X	X	X	?	X	?	?
Mussel	?	X	X	X	-	X	?	X	X	?
Rough winkle	?	-	X	X	-	X	?	-	?	?
Blue rayed limpet	?	X	X	-	-	-	?	-	?	?
Tortoise shell limpet	?	-	-	-	-	X	?	-	?	?
Painted top	?	X	X	-	-	-	?	-	?	?
Whelk	?	X	X	-	-	-	?	-	?	?
Oyster	?	X	X	-	X	X	?	-	?	X
Great scallop	?	X	X	-	-	-	?	-	?	?
Variegated scallop	?	-	X	-	-	-	?	-	?	?
Scallop	?	-	X	-	-	X	?	X	?	?
European cowry	?	X	-	-	-	X	?	-	?	?
Patella aspera	?	X	-	-	-	-	?	-	?	?
Modiolus modiolus	?	X	-	-	-	-	?	-	?	?
Lima hians	?	X	-	-	-	-	?	-	?	?
Cockle	?	X	-	-	X	-	?	-	?	?

(Key to sites as table 8; species in italics where common name is not known)

Table 9 Species of shellfish from medieval sites in Orkney

Species	BB	BU	SRC	RC3	BD	SH
Goose barnacle	?	-	X	-	-	-
Crab	?	-	X	-	-	-
Edible crab	?	X	X	-	X	-
Barnacle indet.	X	?	X	-	-	-

(Key to sites as in table 8)

Table 10 Marine crustaceans and barnacles recovered from medieval sites in Orkney

4.1.4 Seals

Seal bones have been recovered in small numbers from several sites (table 11). Today large colonies of grey seals, *Halichoerus grypus*, and common (or Harbour) seals, *Phoca vitulina*, breed in Orkney on skerries and taings off Hoy, South Walls, North Ronaldsay, Eday, Westray and Wyre, and can be found on most islands (Kaland, 1982). It is difficult to distinguish the two breeds archaeologically. It is often said that since they are no longer culled or hunted seals are more common and less timid today than they were formerly and that the reduction in the fish stocks around the islands is not so much the result of over-fishing by people, as it is a product of the unchecked growth of the seal population.

The small number of seal bones recovered from excavations apparently supports the theory of a smaller seal population, but it may have been the case that butchery took place away from settlements, at the hunting grounds, either on the shore, or in boats. Excepting a single context at South of Red Craig, groups of bones from the same carcass rarely occur together and this again implies that only jointed meat reached the settlement site. A handful of bones belonged to juveniles that may have been clubbed whilst basking on the rocks. If many seals were killed in this way in a single hunt, one might expect butchery to have taken place at the kill-site, thereby obviating the need to carry cumbersome carcasses back to the settlements. There is ethnographic evidence for this practice in Orkney (Berry, 1985).

Some seal bones at South of Red Craig had been chopped, implying the exploitation of seal meat and blubber. Seal skins and the fur of cubs were useful also. At Braeswick, Sanday (gazetteer no. 008) finds accompanying a burial were apparently wrapped in either seal or otter skin. In the historic period people used seal oil in lamps.

Seals play an important part in the folklore of Orkney. Tales of the selkie (sometimes *selchie*) folk, a mythical tribe of people who were half-seal, occur frequently in the collection of folktales kept in the Orkney Sound Archives in Kirkwall Library. One such story (OLSA:77) tells how this race first came to exist. They were the creation of the wicked second wife of the Earl of Norway. He had two children, heirs to his title, by his first marriage. She favoured her son from her former marriage and devised a scheme to be rid of her husband's sons. A witch gave her a potion to stir into porridge that they were to eat prior to a swimming contest in a sheltered voe. Upon entering the water they would turn into fishes. Unfortunately in serving the porridge the woman spilt some of it. The boys ate the remainder but when the contest began they did not turn into fishes, because the potion was only half-effective, instead they turned into seals, and occasionally for a short time they were able to re-assume human form.

Many such stories, however, warn against killing seals. Perhaps this taboo stems from medieval practice. The fact that these stories are rooted firmly in tales of the Norse Earldom, implies a certain antiquity, but in many Viking period contexts at Jarlshof,

Shetland at least, the bones of grey seal were as numerous as those of domestic animals, although there was no indication of numbers (Platt, 1956). Moreover there were Norse laws governing seal and whale hunting (Martens, 1992). Orkney exported sealskins in the seventeenth century and during the eighteenth century there were annual sealing expeditions, during which between 500 and 1000 seals were slaughtered in a couple of days (Berry, 1985, 95).

An average mature female seal weighs in excess of 80 kg, and males are even larger. This compares with estimates of cattle weights of 100 to 200 kg per animal (Rowley-Conwy, 1983). Just two seals could therefore provide a similar amount of edible meat as a single cow. Seals were quite readily available and formed an easy source of food, requiring no husbandry. Historically, their skins have been used to make shoes.

4.1.5 Whales and other cetacean remains

Whales found off Orkney include the pilot whale, *Globiocephala melaena*, the large sperm whale, *Physeter macrocephalus*. Whalebone occurs on archaeological sites both as a raw material and as artefacts (table 11). Whalebone plaques, as the one found in the Scar boat-burial (figure 35), are one of the characteristic artefacts of the period.

Whales might have been washed up, or driven ashore, but in any case a single whale would have provided literally tons of meat, blubber for lighting oil, bones for tools and skin for clothes (Donaldson et al, 1981). Undoubtedly such catches would be butchered on the beach, as has happened in recent times, and relatively few tangible signs of the exploitation of this potentially significant economic resource would therefore survive in the debris from a settlement site. Prescott (pers. comm.) suggested that the so-called slipway at the Brough of Birsay (gaz. no. 002) may well have been a ramp designed for whale butchery. If this is the case, other such sites might exist around the islands. Unfortunately no detailed report of the excavation of this structure in the 1950s exists and the date of the structure is not clear.

Porpoises (*Phocoena phocoena*) and dolphins (*Lagenorhynchus albirostris*) also frequent Orkney's coastal waters, but no remains of either mammal have yet been found archaeologically. Dolphins might occasionally have been washed up or driven onto beaches, and as with whales, would have been butchered there.

Species	BR	TU	BE	SRC	RC3	BU	SC	PL	WE	BB	PO	OR	BD
Indet. seal	X	X	X	X	X	X	-	-	X		X	X	X
Indet. whale	-	X	X	X	-	X	X	X	X	X	X	X	X
Cetacean general	-	-	X	-	-	-	-	-	-		**X**	-	-

Sites additional to those in table 8 are listed here: BR Braeswick, Sanday (8); SC Scar, Sanday (45); PL Pierowall Links, Westray (24); WE Westness, Rousay (27). In addition cetacean remains were recovered from Dingieshowe, St. Andrews (37), Skaill, Deerness (39) and Brettaness, Rousay (175).

Table 11 Cetacean remains recovered from medieval sites in Orkney

4.1.6 Birds

A vast array of seabirds was extensively exploited, as were domestic hens and geese, as a source of meat, feathers, oil and eggs. According to historical sources (Möhl, 1979), birds formed a significant element of the diet for people living at the post-medieval settlement excavated at Hope Colony, Greenland. Wild fowling is similarly documented as an important resource in Orkney and Shetland from the seventeenth century (Fenton, 1978), not only to meet subsistence requirements, but also for export. The list of exports from Kirkwall in the first Statistical Account of Scotland, 1791-99, included feathers (Withrington & Grant, 1978); and the tiny island of Copinsay to the east of Deerness, was specially taxed for its wild fowling (Kaland, 1982: 89). Although bird bones might become accidentally incorporated into the archaeological record, the abundance of bones found in secure midden deposits, makes it clear that birds were caught for food in medieval Orkney also. Butchery evidence in the form of knife cuts and chop marks were found on bones from Tuquoy (Hamilton-Dyer, 1991) though the generally poor preservation of the surface of the bones meant that it was impossible to estimate the total number of butchered bones.

The range of birds found on sites (table 12) included species traditionally caught for food, such as the now extinct Great Auk (*Pinguinis impennis*) together with gulls (*Larus argentatus*) cormorants (*Phalacrocorax carbo*) and shags (*Phlacrocorax aristotelis*). By far the greatest range of species occurred at Buckquoy. The remains of several of the species found there derived from topsoil deposits, but Bramwell (1977) considered these to be residual from the Norse settlement and they are therefore included in table 25. It follows from the variety of habitats in which these birds live today that settlers hunted in moor land, around freshwater, on the seashore and on mud flats, along the cliffs and even in open water.

Figure 35 A whalebone plaque found inside a ninth century boat burial at Scar, Sanday (Photo: Magnar Dalland; height c. 30 cm)

Species	SRC	RC3	BD	BB	SH	TU	PO	BE	BU
Hen	-	-	-	-	X	X	X	?	X
Goose	X	-	-	X	-	X	X	X	X
Red/Black throated diver	X	-	X	-	-	-	-	?	-
Great northern diver	-	-	-	-	X	-	-	?	X
Fulmar	-	-	-	-	-	-	X	?	X
Manx shearwater	X	-	-	-	X	-	X	X	X
Gannet	X	-	X	-	X	X	X	X	X
Cormorant	X	-	-	-	X	X	X	X	X
Shag	X	-	-	-	X	X	X	X	X
Grey heron	X	-	-	-	-	-	-	?	-
Crane	X	-	-	-	-	-	-	?	-
Spotted crake	-	-	X	-	-	-	-	?	-
Mute swan	-	-	-	-	-	-	X	?	X
Whooper swan	-	-	-	-	-	-	-	?	X
Smew	-	-	X	-	-	-	-	?	-
Ruff	-	-	X	-	-	-	-	?	-
Mallard	X	-	-	-	-	X	X	?	X
Shelduck	-	-	-	-	-	-	-	?	X
Duck	X	-	-	-	-	X	-	?	X
Teal	-	-	-	-	-	-	X	?	X
Widgeon	-	-	-	-	-	-	-	?	X
Shoveler	-	-	-	-	-	-	-	?	X
Eider	X	-	-	-	-	-	-	?	X
Common scoter	-	-	-	-	-	-	-	?	X
Golden eye	-	-	-	-	-	-	-	?	X
Osprey	-	-	-	-	-	-	-	?	X
Merlin	-	-	-	-	-	-	X	?	X
Kestrel	-	-	-	-	-	-	X	?	X
Red grouse	-	-	-	-	-	-	-	?	X
Black grouse	-	-	-	-	-	-	-	?	X
Crane	-	-	-	-	-	-	-	?	X
Water rail	-	-	-	-	-	-	-	?	X

Species	SRC	RC3	BD	BB	SH	TU	PO	BE	BU
Corncrake	-	-	-	-	-	-	-	?	X
Oyster catcher	X	-	-	-	-	-	X	?	X
Plovers	X	-	-	-	-	-	X	?	X
Turnstone	-	-	-	-	-	-	-	?	X
Dunlin	-	-	-	-	-	-	-	?	X
Knot	-	-	-	-	-	-	-	?	X
Green shank	-	-	-	-	-	-	-	?	X
Waders sp.	-	-	X	-	-	X	-	?	-
Curlew	X	-	X	-	-	-	X	?	X
Whimbrel	-	-	-	-	-	-	-	?	X
Jacksnipe	-	-	-	-	-	-	-	?	X
Grey phaparope	-	-	-	-	-	-	-	?	X
Skua	-	-	-	-	-	X	-	?	X
Greylag goose	-	-	X	-	-	-	X	?	-
Lesser black-backed gull	X	-	-	-	-	-	-	?	X
Greater black-backed gull	X	-	-	-	X	-	X	?	X
Gull indet.	X	-	-	X	-	X	X	?	X
Herring gull	-	-	-	-	X	-	-	?	X
Kittiwake	-	-	-	-	X	-	X	?	-
Little Auk	X	-	X	-	-	-	X	X	X
Great Auk	X	-	-	-	-	-	X	X	X
Auk sp.	-	-	-	X	-	-	-	?	-
Razorbill	X	-	-	-	X?	X	X	?	X
Guillemot	X	-	-	-	X?	X	X	?	X
Black Guillemot	-	-	-	-	-	-	X	?	X
Redshank	-	-	-	X	-	-	-	?	-
Puffin	X	-	X	-	-	X	X	?	X
Starling	X	-	X	-	-	-	-	?	X
Rock dove	X	-	X	-	-	-	X	?	X
Dove	X	-	X	-	-	-	-	X	-
Passerine indet.	X	-	-	X	-	X	X	?	-
Hooded Crow / raven	X	-	-	-	-	X	X	?	X
Ring Ousel	-	-	X	-	-	-	-	?	X

Species	SRC	RC3	BD	BB	SH	TU	PO	BE	BU
Song Thrush	-	-	X	-	-	-	-	?	X
Turdidae	-	-	X	-	-	-	-	?	-
Pigeon	-	-	-	X	X	X	X	?	-
Sea Eagle	-	-	-	-	-	-	X	?	-
Pochard	-	-	-	-	-	-	X	?	-
Buzzard	-	-	-	-	-	X	-	?	-
Knot	-	-	-	-	-	-	X	?	-
Indeterminate	X	X	X	X	X	X	X	?	X

Table 12 Bird remains recovered from medieval sites in Orkney

4.1.7 Driftwood

The sea also provided a valuable supply of driftwood, seaweed, pumice and, of course, sand and cobbles, all of which had their uses in domestic life (table 13). Even middens themselves were often re-used.

The amount of driftwood washed up on beaches then was arguably little different from that today. There were many tens of wooden ships, some carrying cargoes of timber, plying the waters, and many of these must have come to grief (see 2.1.1). In addition, there was more natural woodland both in Orkney and northern Scotland than survives today, and this would have added to the supply of driftwood. Birch (*Betula*) hazel (*Corylus*) and willow (*Salix*) are species native to Orkney. Birch and hazel survive in peat deposits and both birch and willow survives in relict woodland in Orkney (Donaldson, 1986). The occurrence of other woods, including oak (*Quercus sp.*) alder (*Alnus*) pine (*Picea sp.*) and spruce (*Picea abies*) is attributable either to imports or to their collection as driftwood (Rackham, 1989). Fragments of oak, pine, ash and alder were retrieved from Beachview.

4.1.8 Sand and shingle

Beach pebbles were used in cooking and also as linen smoothers, spindle whorls and weights. The pumice and amber that occur on a handful of sites were probably also collected from local beaches. Shell sand was used to produce lime mortar and may also have served as a fertiliser on the land. Sand is, of course, the primary raw material used in the manufacture of glass and opaque glass beads and tesserae were produced locally at the Brough of Birsay (Curle, 1982).

4.1.9 Seaweed

Donaldson *et al.* (1981) and Bell (1981) drew attention to the importance of seaweed to the present day, as a source of animal fodder, fuel, manuring, for human consumption and even caulking for boats. According to the First Statistical Account of Scotland the collection and burning of kelp to produce alkalis used in glass and soap manufacture was a recognised industry in Orkney from 1722. Kelp kilns associated with this industry were excavated on the Brough of Birsay (Hunter, 1986b) and on sites in Birsay Bay (Morris *et al*, 1989). It is possible that the fragmentary remains of seaweed from such modern features have become incorporated into the archaeological record. Unless carbonised, seaweed rarely survives on archaeological sites, but its presence is indirectly indicated by the discovery of species of molluscs that live on seaweed, and must have been collected with it (see above). The bladder wrack (*Fucus vesiculosus*) was discovered in a Norse context on the Brough of Birsay, and the carbonised remains of kelp have also been recovered from sites in Birsay Bay (Donaldson & Nye, 1989). Crawford (1979) found carbonised seaweed in a cooking area at the Biggins, Papa Stour, Shetland. Deposits of seaweed were found at Pool (Hunter *et al*, forthcoming). Seaweed may have been used as a mordant for dyeing and as a hot alkali bath to bleach linen (Bond, 1994). The latter use would tie in well with the known cultivation of flax, probably to produce linen, at Pool.

4.1.10 Shell Middens

The construction of several Viking settlements in Orkney involved the re-use of middens from earlier settlements as a revetting for external walls. The re-use of shell middens to lime fields, surface roads and to make mortar and rendering is well attested archaeologically in Caithness in the Viking and Late Norse period (Batey, 1987) and elsewhere (Ceci, 1984). Such a practice may account for the apparent paucity of shell midden sites found in Orkney. At Pool, Sanday midden material from earlier phases of settlement was reused in the wall-core of Viking period structures (Bond, 1994, 267).

4.1.11 Otters

Eating a diet almost exclusively of sea fish and living on the coast, the otter (*Lutra lutra*) in the Northern Isles is effectively a sea mammal (Berry, 1985, 93). A passage in the *Orkneyinga Saga* records the Earl and his men hunting otters on Rousay (Palsson & Edwards, 1978, ch. 74). Otter bones have been found at South of Red Craig, Pool and from a Pictish phase at Buckquoy). It will be interesting to see if any survive in the faunal assemblage from Westness, the estate where the Earl was staying when he went hunting on the expedition noted above.

Material	BB	BD	SH	SRC	RC3	BU	BE	OR*	TU	PO
Driftwood	X	X	X	X	X	-	X	?	X	?
Seaweed	X	X	X	X	X	X	X	?	X	X
Pumice	X	X	-	X	X	-	?	?	?	X
Amber/jet	X	-	-	X	-	-	?	?	?	?
Pebbles/cobbles	X	X	X	X	X	X	?	?	X	X
Sand	X	X	X	X	X	X	?	?	X	X
Otter	-	-	-	X	-	-	?	X	?	?

* Preliminary information only (Mainland, 1994)

Table 13 Other marine resources recovered from medieval sites in Orkney

4.2 The under-representation of marine assemblages

The exploitation of a range of marine resources can thus be demonstrated, but the extent to which the subsistence economy depended upon those resources remains unclear. The complex means by which material becomes incorporated into the archaeological record requires consideration. Once deposited, an object's survival to the point of excavation is by no means guaranteed, and of course, the methods and strategies employed during an excavation affect the likelihood of its eventual recovery. It is my thesis that marine environmental remains are particularly fragile in this respect and that the tiny samples recovered in excavation bear little or no relation to the original importance of sea produce to the diet.

My case is adequately demonstrated by the excavations of Håbets Koloni, Hope Colony, Greenland, founded by a Norwegian cleric in 1721 to find and convert the original Scandinavian settlers (Gullöv & Kapel, 1979). The colony lasted just seven years before being dismantled and moved to the mainland and there is thorough documentation of precisely how many people lived there and what they ate. The excavated environmental assemblage varies markedly from the evidence of these historical sources, in particular in respect of the quantity of marine resources eaten.

Under 40% of the settlement was excavated. A dwelling house and smithy were excavated in entirty and a trial trench put through a structure described as a warehouse. Two remaining stables, a latrine and a storehouse were not excavated, nor was the area between the buildings.

4.2.1 Case study: Hope Colony, Greenland

Hope Colony was established not only as a Christian mission, but also as a business venture on behalf of the Bergen Company in Norway to create an economic base for the colony through trading with the local eskimo population. In addition, the Bergen Company was to re-establish in Greenland waters the whaling operations severed during the Northern War (1709-1720). In return for this two supply ships, loaded with goods for trade and some store, mainly dried fish, salted herring, wine and brandy, arrived yearly from Bergen.

By the end of its second year the colony consisted of a dwelling house, smithy, stable, warehouse, a small timber-built house, a latrine and cemetery. Surveys of these buildings detailing their dimensions, layout, construction materials and even who lived where, accompanied the annual accounts from the colony that the Bergen Company submitted; these listed all the effects held at Hope Colony.

These annual accounts, together with the diary kept by the leader of the project, Hans Egede, and the journal of the Colonial Council detail the lives of the inhabitants, and more especially for my purpose, their diet. Möhl (1979) provided a definitive list of the

published references to husbandry and hunting. The year following the establishment of the colony, Egede requested goats and hens from the authorities in Norway. He apparently received these animals, and a year later, five pigs, a goat, four cows and seed for grain. Before that year ended the colonists had to slaughter two oxen since they had insufficient fodder. An unspecified number of sheep, apparently sent out with the colonists, bred successfully for the first two years, but died in the winter of 1724. The geese also died, but one ox and two cows survived to produce two heifers and two bull calves in the final year of the settlement.

The environmental assemblage from the excavation came only from the floors of the two domestic buildings, and therefore represents only a small proportion of the original household refuse. There were no middens; it seems likely that rubbish was thrown into the sea. In the case of the domesticated animals the minimum numbers of individuals estimated from the archaeological remains, is remarkably similar to the historical evidence (table 14).

	Archaeological evidence		*Historical evidence*
	Fragments	**Individuals**	**Individuals**
Cattle	238	6	8
Sheep	32	2	6
Goat	0	0	1
Pig	21	2	5
Geese	0	0	6
Hens	6	2	6
Dog	1	1	2

Table 14 Archaeological and historical evidence for domesticated animals at Hope Colony

	Midday	*Evening*
Sunday	Peas, meat	Peas, meat
Monday	Groats, porridge, herring	Gruel
Tuesday	Peas, salmon	Peas, salmon
Wednesday	Groats, porridge, herring	Gruel
Thursday	Peas, dried fish	Peas, dried fish
Friday	Groats, porridge, cheese	Gruel
Saturday	Groats, porridge, herring	Gruel
	To this three full wooden cans of beer daily	

Table 15 The daily ration taken from the Council's journal, October 1724

The daily ration, reported in the Council's journal, makes it clear that beef, mutton, pork, domestic fowl and dairy produce contributed only a small part to the diet; it was based on fish grain and peas (table 15, after Gullöv & Kapel, 1979, 201). Hunting and fishing were therefore important activities, though often apparently conducted with limited success by the colonists, at least in the first couple of years. Fishermen used both nets and hooks and lines, though no trace of net fishing was found archaeologically. Seal and whale were hunted with little success and were usually bought from the Eskimos. Reindeer, hare and ptarmigan were shot. The numbers noted in Egede's diary, itself incomplete, far outweigh those found during excavation (table 16). A single bone of ptarmigan was all that survived from a minimum estimated catch of 140 birds, and only 70 cod bones represented the wide range of fish that were actually caught: about 50 barrels of salmon, as well as numerous catches of herring, capelin, halibut, cod and sea scorpion. There were over one hundred fish in a single barrel (Möhl, pers. comm.). The fish sent from Norway was dried and ready filleted, so it is no surprise that these fish are not represented in the archaeological record. Interestingly and in contrast to this, the variety of wild birds recovered in excavation outnumbered those in the historical record. In addition, the colonists used local supplies of driftwood to meet all of their heating and cooking requirements. No driftwood survived in the archaeological record.

Möhl (1979, 224) recognised the discrepancy between the surviving remains of wild fauna compared to the estimated numbers caught, but nevertheless, he arrived at the conclusion that the wild fauna contributed little to the diet. This, despite the fact that the Council's journal clearly lists salmon twice per week, herring three times per week and dried fish twice per week. There is no reason to assume that these fish were all cargo from the supply ships, nor that the meat was salted meat from stores, rather than freshly caught reindeer or birds.

Egede's diary is not complete. Some months contain no mention of hunting expeditions, or are completely absent from the record. There was little hunting during the winter months. It is probable therefore that the figures in table 16 can be at least doubled. In 1722 Egede wrote with increasing concern that no supply ship had arrived and they had very little food. The months prior to this reported failed or poor hunting expeditions, and clearly this had caused the problem. It was never intended that food from the annual supply ships should last the whole year. In most years in the months of August, September and October, for example, there were weekly hunting expeditions. These would provide not only fresh food, but also a surplus that might be dried or salted and kept for the winter months.

	Archaeological evidence		Historical evidence
Species	***Fragments***	***Individuals***	***Individuals***
Halibut	0	0	34
Cod	70	?	7
Sea scorpion	0	0	6
Red fish	0	0	6
Herring	0	0	6+weekly ration
Capelin	0	0	6
Salmon	0	0	50 barrels
Walrus	2	?	0
Seal	169	?	0
Whales	1	1	1
Ptarmigan	1	1	140
Duck	30	?	12
Shearwater	9	?	0
Cormorant	4	?	0
Oldsquaw	4	?	0
Merganser	1	?	0
Falcon	2	?	0
Gull	23	?	0
Kittiwake	1	?	0
Great Auk	4	?	0
Dovekie	3	?	0
Alcids	114	?	0
Guillemot	28	?	0
Raven	2	?	0
Birds indet.	25	?	6
Eggs	0	0	6
Hare	8	?	84
Fox	3	?	5
Reindeer	94	?	53

Table 16 Archaeological and historical evidence for wild fauna at Hope Colony

I am not attempting to argue here that the settlement at Hope Colony had a similar subsistence base to medieval sites in Orkney. In Greenland there was only a limited

opportunity for cultivating crops and insufficient grazing for the few animals that the colonists did keep. What this study makes clear, however, is that marine resources at Hope Colony were more significantly under-represented in the archaeological record than other faunal remains, in particular those of domesticated species, to the point where they appeared to be completely absent. That this is the case also at sites in Orkney remains to be demonstrated.

The paucity of fish bones at Hope Colony was probably due to original refuse disposal patterns, though it is important to note that the excavation report does not mention the implementation of wet-sieving on the site. Even if bones were only collected by hand the quantities of fish bone recovered are still smaller than one would expect given the amount of fishing which is recorded. Similar taphonomic filters affect the recovery of fish bones from sites in Orkney.

4.2.2 The taphonomy of marine remains

The case of Hope Colony demonstrates that the remains of marine resources are less likely to be recovered than other faunal remains, and are therefore grossly under-represented in archaeological assemblages, but why should that be the case? This section outlines the taphonomic factors that determine the survival of the various forms of marine life exploited in medieval Orkney. These factors come into play from the moment at which a fish or seal was caught, or the seaweed collected, through its consumption and discard. It is only through consideration of the nature of this cycle, together with the physical and chemical attributes of the component material, its burial environment, and the means by which it is eventually excavated, analysed and conserved that the tables of statistics in specialist reports can be adequately interpreted.

Hunting, fishing and collection

Historically, the large scale netting of seals was commonly practised on skerries and taings around the islands. The hunters erected nets in the inter-tidal zone near seal colonies, and as the tide fell they drove the seals off the rocks and into the nets. They killed the seals by clubbing or shooting (Berry, 1985). By contrast, whales were either washed ashore by chance or were driven ashore purposely. As in the recent past it is likely that in medieval times seals and whales were butchered at the kill-site. This would account for the paucity of bone remains found on settlements, and the virtual absence of articulated skeletons.

Jones and Wheeler (1989, 64) demonstrated that in traditional societies entire fish catches are rarely landed. Certain species and small fish are often thrown back into the sea. Moreover initial processing, such as the removal of sharp or poisonous spines, often takes

place at sea or at a processing site some distance from settlements. Colley (1989) described various types of fishing practised in Orkney last century. Many of these involved the use of processing sites away from settlements, and methods of disposal which would leave little trace in the archaeological record. This is hardly surprising if one considers how much rotting fish smells. At Freswick Links, Caithness, a Norse settlement that was the subject of environmental survey and excavations from 1979 and 1982, there was a fishery, apparently specialising in medium and large cod, ling and saithe (Morris *et al*, 1992). Fish, shellfish and crab dominated the faunal assemblage, varying in density from 0.2 to 67 g for every 10 litres of sediment across the site. It is not yet clear, however, whether this distribution mirrors the original composition of the fish waste, or if it is the result of differential erosion or preservation on the site.

The proportion of the different parts of a skeleton that survive give some indication of butchery practices such as filleting, decapitation and gutting, but in the case of seals and whales such details are rarely given.

Consumption and use

People may have eaten fish and cetacean meat raw or cooked. Experiments have shown that boiling softens bone, making it more vulnerable to mechanical damage (Jones & Wheeler, 1989, 67). Bones were often reused to make artefacts; items like whalebone plaques are clearly diagnostic, but bone pins and the like often are not. The composition of the bone artefact assemblages is often overlooked in environmental reports since specialists do not always see that material as a matter of course.

Discard

Bones fed to pigs or dogs leave little trace. Similarly bones on rubbish heaps would have been consumed by rats and other scavengers. The skeletons of dogs, rats and other rodents occurred on all settlement sites. In experiments a maximum of 13% of bones ingested by a rat, a pig, a dog and a man were found to survive (Jones & Wheeler, 1989, 67). Where bones did become incorporated into floors levels they would often be crushed beyond recognition. At Tuquoy many bird bones had been gnawed either by cats or otters, rather than dogs (Hamilton-Dyer, 1991). Bird bones gnawed by dogs occurred at Pool (Serjeantson, forthcoming). Of course this method of discard does not just affect marine remains, but experiments show that fish and bird bones are the types of bone most vulnerable to total destruction when ingested (Jones & Wheeler, 1989, 67).

Post-depositional factors

Those bones that do become incorporated into the archaeological record are subjected to physical and chemical damage according to their inherent properties and the burial environment. Fish bones are more fragile than those of sea mammals (Jones & Wheeler, 1989, 62).

Acid burial environments rarely produce fish remains. The site excavated on the Brough of Birsay (Hunter, 1986b, 166) had no shell-sand deposits and consisted entirely of peat and acidic turf on boulder clay soils with poor drainage, conditions not conducive to the preservation of fish bones. Other archaeological sites around Birsay Bay, however, comprised a large proportion of blown sand, facilitating environmental processing but detrimental to environmental remains, due to the abrasive action of the mineral particles, and physical and chemical weathering caused by periodic wetting, and of course, sea erosion. Fish bone, in particular, is not very resistant to attrition (Jones & Wheeler, *op cit*, 63). Nevertheless, the bones from Buckquoy, South of Red Craig, Red Craig and Saevar Howe were all in an excellent state of preservation. The marine assemblages found at these sites were small due to contextual and temporal variations, as well as excavation recovery procedures (see below).

Rackham (1987, 348) considered the majority of the bones found on the Brough of Deerness to be birds' carrion, dropped by chance on the site, and not waste from human consumption. This source together with some wind blown fragments must account for some of the material found on many sites, although Noddle (1977, 201) argued that the bone material from topsoil at Buckquoy was residual from the Norse settlement since the composition of the assemblage was virtually identical to that from the Norse horizons. Some fish may have arrived on sites in otter spraint (Colley, 1988, 7).

Contextual variability

The distribution of material recovered varied within individual sites. Rowley-Conwy (1983) compared recovery rates to context variability at Saevar Howe, but concluded that contextual effects had been relatively minor. His distinguishing criterion was whether the bones were meat bearing or waste. There appeared to be no clear distinction in the quantity of bones discarded outside and inside buildings or in the relative quantities of animal bone and fish bone recovered from similar features and contexts (table 17). His analysis did not, however, consider the absolute quantities of material concerned and this may show a significant variation.

	Sand blow	Tumble	Ground surface	Walls	Drains	Midden	Floors
No. excavated	10	6	13	38	1	7	12
Fish remains	5	2	8	2	0	1	5
Animal remains	7	2	5	4	0	1	5

Table 17 The range of contexts at Saevar Howe yielding faunal remains (extrapolated from Rowley-Conwy and Colley, 1983)

The occurrence of faunal remains in midden contexts is surprisingly low, given that a midden is characterised by such waste. The figures may be misleading since Farrer destroyed much midden material at Saevar Howe without record in the nineteenth-century. At Jarlshof, Shetland most of the environmental assemblage derived from midden deposits away from contemporary house floors and the paved areas surrounding buildings. As one might expect people kept the latter areas clean (Hamilton, 1956; figure 36).

The site at South of Red Craig, interpreted as the edge of a settlement site (Morris *et al*, 1989), boasted a wider range and greater quantity of faunal remains than other sites excavated in Birsay Bay, where excavation has concentrated upon the domestic and farm buildings at the heart of the settlement (figure 37). The largest quantity of fish remains, accounting for some 140,737 fragments, came from middens which accumulated over the Late Norse hall at Tuquoy and which were probably associated with a Medieval settlement nearby. Large scale excavations at Tuquoy and Pool produced similar quantities of bird and animal bone but the quantity of fish bone from Tuquoy far outweighed that at Pool. There were, however, significantly more seal remains from Pool.

Buckquoy produced high quantities of marine remains (of which shellfish and sea mammal numbers are the best indicator), again mainly from midden contexts. Noddle (1977, after Isaac, 1971) pointed out the limitations of interpreting faunal remains from middens, reduced by scavengers to as little as 50% of their original size in less than six months. As noted above (4.1.10) middens were also used in construction. Because they are situated on the periphery of sites, perhaps nearer the sea, in which case they are also amongst the first sites to be lost through erosion. Sites in Birsay Bay, Tuquoy and Pool have all suffered severe erosion (chapter 3) and it is likely that many medieval structures and middens have been lost.

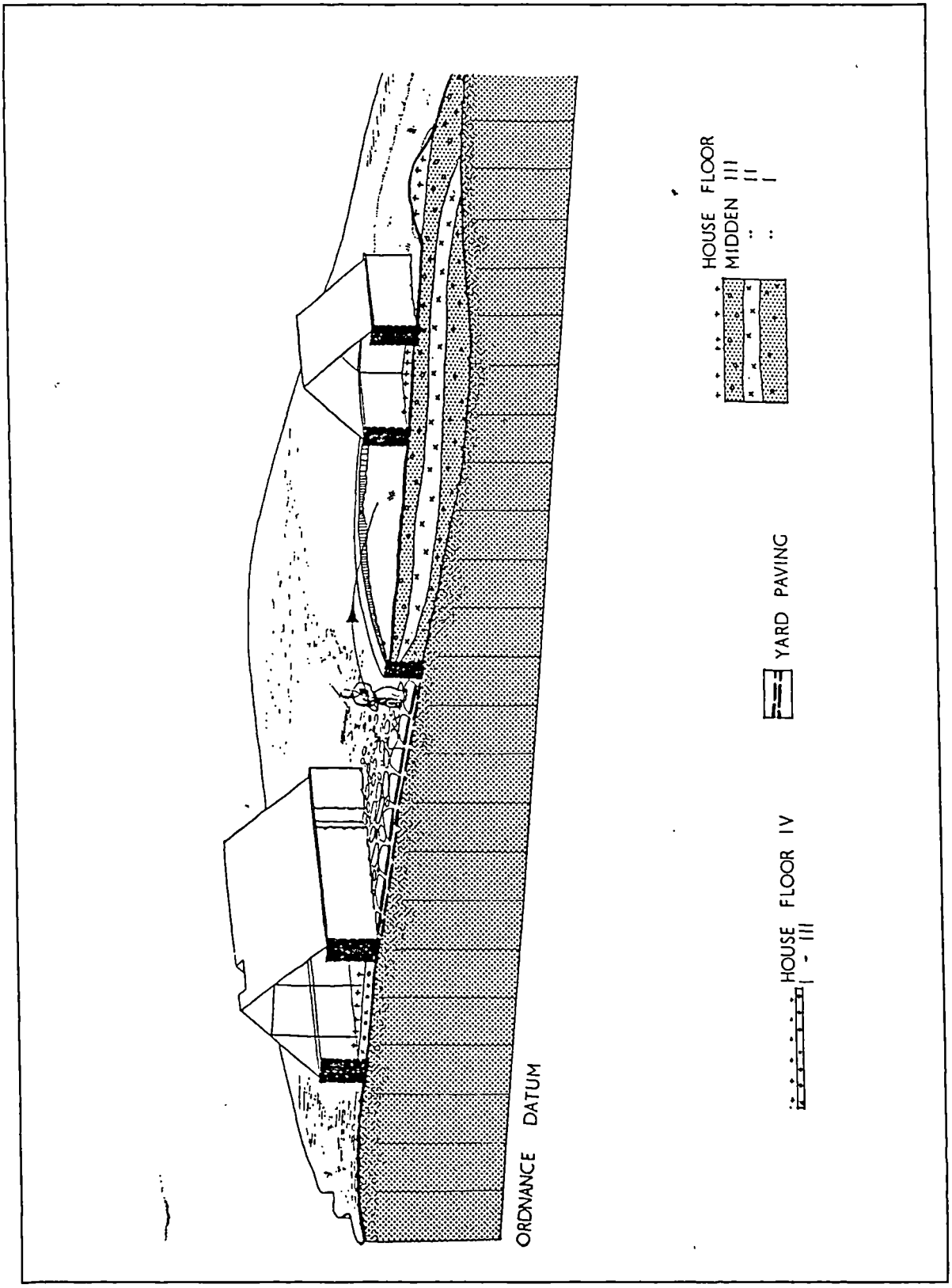


Figure 36 Contextual variability at Jarlshof, Shetland (after Hamilton, 1956)

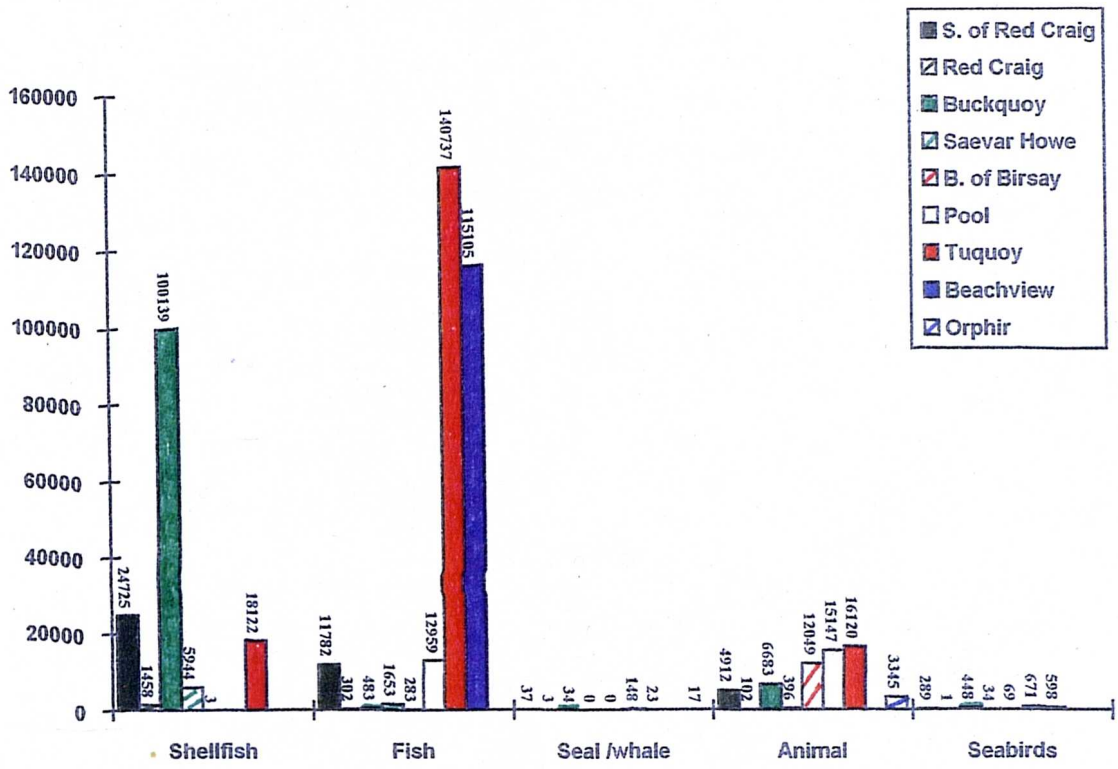


Figure 37 Bar chart showing the number of fragments of bone found on sites in Orkney. (NB. The volume of soil excavated varied from site to site. These figures are intended are a guide only. The sites are not directly comparable).

The only other extensive investigation of midden deposits in the Orkney Earldom was at Freswick Links, Caithness. The middens were associated with a Norse settlement. The area has been the focus of considerable archaeological attention (Batey, 1984; Batey, 1987a). Following a test survey in 1979, column samples were taken from the cliff face between 1980 and 1982 (Morris & Rackham [eds.], 1992, 43). Analysis showed that fish remains were dominant in the faunal assemblage. The quantities of shellfish and crab recovered were also high. The site was interpreted as a fishery. The distribution of fish remains across the site varied, but it is not yet clear if this was a reflection of original deposition or differential preservation or post-depositional disturbance (Jones, 1992b, 90). The final environmental reports on the site are not yet available but preliminary results (Morris & Rackham, 1992) indicate that the numbers of bones recovered from the middens at Freswick will inevitably outnumber those from any site in Orkney. This need not imply that the site had a special status or economy. It may reflect nothing more than the meticulous recovery procedures employed on the recovery of information from the middens, on the periphery of the site, rather than deposits within the heart of the settlement.

One key question about refuse disposal patterns remains unanswered. Were fish remains more likely than animal bones to be deposited in middens on the periphery of the site?

Excavation collection procedures

The lack of any sieving of deposits during excavation accounts for the low numbers of fish bones from Buckquoy compared with the relatively high figures of shellfish and sea mammal remains. All collection was by hand, and consequently only large fish bones were collected. By contrast, many archaeological deposits at the sites at Red Craig (Morris *et al*, 1989) were dry sieved through a 1 cm mesh, with some midden contexts being wet-sieved through even finer meshes. Not all samples or contexts were sieved, making interpretation of the differential recovery of fish bones difficult (Colley, 1989, 248). To establish this it would, in theory, be necessary to sieve all bone-bearing deposits from a site. This is rarely, if ever practical, and a judgmental, but systematic sampling strategy is often employed (Jones & Wheeler, 1989, 42). Such a procedure was employed in the investigation of the Norse fish processing site at Freswick Links, Caithness (Batey, 1987a), and a standard sampling strategy has been proposed by Jones & Wheeler (*op. cit.*, 44ff). The environmental assemblage from the Brough of Birsay was collected by "normal hand-methods and by the wet-sieving of clay soils" (Seller, 1986, 208). Deposits at Saevar Howe were sieved through a 5 mm mesh, rather than the 3 mm mesh which is recommended for the recovery of fish bones, and the 1 mm mesh recommended for the recovery of particularly small bones (Colley, 1983a). Bond (1994) noted that the integrity of the fish bone assemblage at Pool was compromised by a lack of systematic recovery by sieving. In future it might be worth implementing random sampling of all bone-bearing deposits from a site, thereby overcoming the difficulty of interpreting results from judgemental sampling programmes.

In terms of recovery practices then only those sites excavated at Red Craig by Christopher Morris are directly comparable. Clearly there is a need to adopt standard collection procedures, particularly for work on sites occupied over a similar time span and situated within a small geographical area.

Temporal variation

An increase in the exploitation of marine resources in the late Norse period has been noted by the respective excavators (figures 38 and 39) at Buckquoy (phases IV, V, VI), the Brough of Birsay (phases 2.2, 3), South of Red Craig (phases C & D), Red Craig (phase 3), Saevar Howe (phase II), Tuquoy (phases X - XIV) and at Pool (phases 7 - 8). The evidence for this is questionable since few of the sites span both the Viking and Late Norse phases.

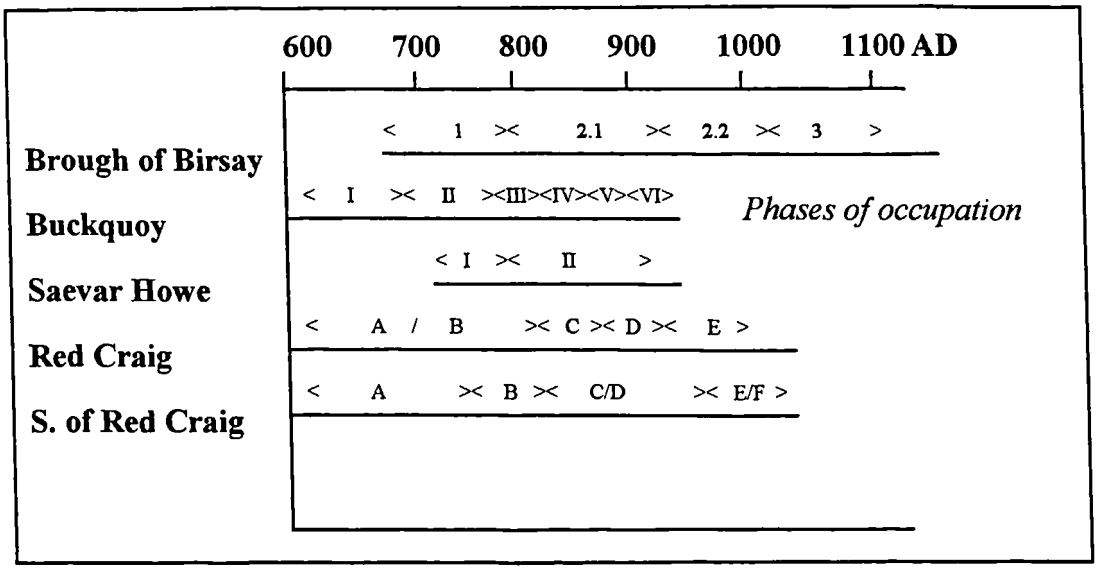


Figure 38 Phases of occupation at the case study sites
(The phasing at Tuquoy, Beachview and Pool is not yet finalised)

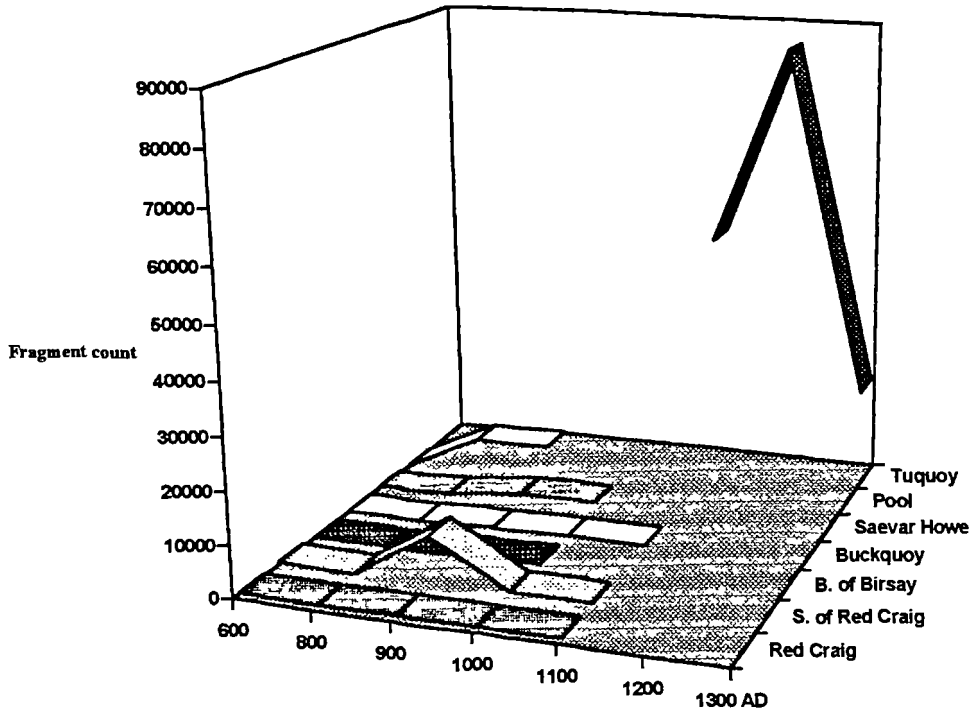


Figure 39a The increased marine resource exploitation (based on fish bones) in the late Norse period in Birsay Bay (information not available in this format at Beachview)

The huge quantity of fish bones recovered from Tuquoy makes that from other sites look completely insignificant, but the sites are not directly comparable since the extent of the excavated areas varies significantly between sites. Deposits from along a stretch of coastline 100m long were sampled at Tuquoy, whereas the excavation at S. of Red Craig covered an

area of just 60m². Figures 39a & b shows the quantities of fish bone from sites split over time. Tuquoy is removed in 39b to show the other sites more clearly.

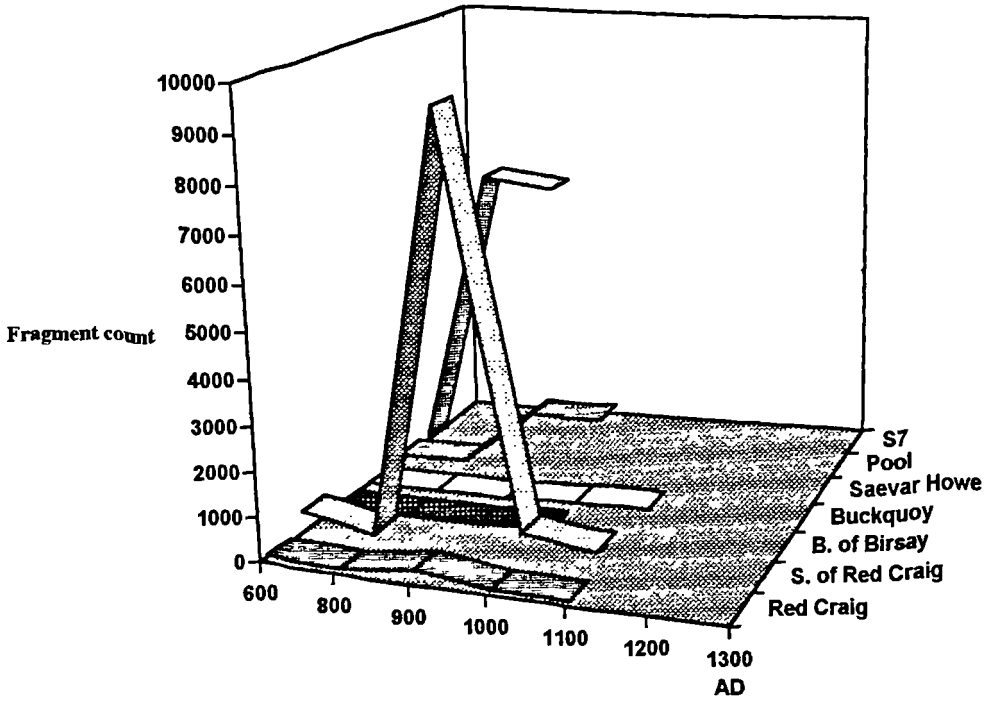


Figure 39b The increased marine resource exploitation (based on fish bones) in the late Norse period in Birsay Bay (Tuquoy removed)

If there is a temporal change in the exploitation of marine resources this might be explained by the conversion of the Earldom to Christianity. Fish was not considered by the Church to be meat, and it could therefore be eaten on days of abstinence (Grant, 1988, 170). The majority derived from middens dumped over the Late Norse hall (Colley, 1988). The recovery of fish bones at Beachview, mostly from midden contexts, was slightly higher than at South of Red Craig. It will be interesting to compare the quantities with the assemblage from Orphir when it is available. The quantities of fish bone recovered from Tuquoy are exceptional. Nevertheless the quantity deposited within and outside the Late Norse hall during the period of its occupation is higher than on any other site in Orkney at this time. It is not yet clear to what extent this is a factor of the burial conditions, recovery procedures or original disposal patterns.

The quantities of fish bone recovered at Tuquoy are comparable to those from the near contemporary site at Freswick Links, Caithness. This site was interpreted as a Norse fishery (Batey, 1987a). It was certainly a fish processing site, but I have suggested that the amount of material recovered is simply in line with the status of the site and the number of people who lived or were periodically entertained there (see summary). The quantities of

fish bone at Freswick are much smaller than those recovered from stockfish trading sites in Norway (Morris & Barratt, pers. comm.).

Extensive fish bone middens have been recovered from two other Late Norse sites: Robert's Haven in Caithness and St. Boniface in Papa Westray (Barratt, pers. comm.). Little information is currently available on the latter site. So remarkable was the preservation at Robert's Haven that individual episodes of activity such as the processing of bait and of the fish subsequently caught were distinguishable in stratigraphic succession. The middens there seem to represent a processing site. It is not yet clear if the production was to meet local needs or for the export of stockfish (Barratt, forthcoming).

In summary it it evident that many processes affect the numbers of fragments of different species found in archaeological environmental assemblages, and often the amount of material recovered appears to bear little relationship to original patterns of exploitation. The means by which this differential might be calculated are explored in the following section.

4.3 Quantifying the evidence

Three standard quantification techniques are regularly applied to faunal assemblages: fragment counts, estimates of the minimum number of individuals present, and calculations of the calorific value of the meat from those individuals (Lie, 1980; Barratt, 1993). Whilst the application of these two techniques is valid when comparing like with like, such as the estimated number of sheep produced from excavations at two farms, the same is not true of different species (Lyman, 1982). The direct comparison of the minimum number of sheep with the minimum number of fish or cattle, whether at the same site, or at different sites, is invalid and produces misleading results, since the the original number of bones in each animal, their fragility and preservation characteristics differ. Calculations of the respective calorific values of two different species are legitimate in principle, although in practice, the figures presented in reports are usually based upon estimates of numbers of individuals, and so this method is also flawed (Rowley-Conwy, 1983). A fourth technique used by Barratt (1993) on faunal remains from the Norse mill at Orphir is to use the weight of the excavated bone assemblages to calculate the meat yield. Calculations using this technique on part of the assemblage from Orphir suggested that fish made up approximately one quarter of the diet.

In this section I review the quantification techniques used on the five published excavations in Birsay Bay and then propose a new system that allows a more direct comparison of faunal and marine assemblages both inter- and intra-site.

The results presented are a guide only, and serve to indicate just how imprecise the calculations presented in excavation reports are. Far from being a minor element in the diet marine resources may have equalled or even outweighed domestic produce.

4.3.1 Fragment counts, estimates of numbers and calorific yields

Fragment counts were published for species at all of the case study sites, except for the fish bones at Buckquoy (see figure 37) where minimum numbers were given instead. Calculations of the minimum number of individuals represented in a given assemblage are normally based upon an analysis of the anatomical distribution of the bones. Hence a single left scapula indicates the presence of one individual, but ten vertebrae might derive from between one and ten animals. In some cases it is possible to determine the exact number of animals according to whether the bones articulate or divide into a certain number belonging to the animals' left or right side. The total minimum number of individuals is usually calculated from the frequency of the most common skeletal element found. In the case of fish bones Casteel (1976, 62) considered the merits of using otoliths and scales as well as vertebrae for this purpose. To avoid counting the same animal twice numbers are usually

totalled for each sub-phase, rather than each context (Rowley-Conwy, 1983), though Bond (1994) preferred to count animal bones by context. This may account for the high estimated minimum numbers of individuals in animal bones (but not fish or shellfish) at Pool. Lie (1980) used statistics to produce a more precise result based on counting paired skeletal elements; he cited a case where 133 horse metacarpals divided into 60 left and 73 right. By the conventional method this would produce a minimum estimated number of 73 individuals present, whereas the statistical technique that he employed calculated 93 to be the minimum number. Fieller & Turner (1982) took a similar approach. There is no single accepted technique for estimating the numbers of animals. Many specialists do not explain which techniques they are using, whilst others simply avoid making such calculations.

At the Brough of Birsay both the minimum and the maximum numbers of animals present were estimated. Minima were produced for species at Buckquoy and Saevar Howe, but none was given for Red Craig and South of Red Craig, although in each case detailed skeletal reports were published (table 18)

Species	**Brough of Birsay**	**Buckquoy**	**Pool**	**Beachview**	**Saevar Howe**
Cattle	87 / 20	50+	371*	9*	9+
Sheep/goat	54 / 20	44+	339*	20*	13+
Pig	26 / 11	23+	197*	7*	5+
Fish	Not given	46+	390*		156+
Seal	0	4+	10*		Not given
Seabirds	Not given	50+	?		14+

Table 18 Published estimated numbers of animals excavated on sites
(Norse occupation phases only; figures for Tuquoy not available)
* Preliminary figures only

The calorific value of an assemblage is the product of the estimated carcass weight, the number of individuals and the number of calories per unit weight of meat. The carcass weight is either derived from analysis of the bone material to determine the size and approximate age composition of the various species, or is based on modern species. Noddle (1977, 204) estimated that an adult cow weighed from 180 to 200 kg, a sheep might weigh about 20 kg, a pig 15 to 40 kg (Rowley-Conwy, 1983, fiche 73), a seal about 80 kg (see 4.1.4) and fish as little as 0.25 or as much as 8 kg, depending on the species and age (Colley, 1983a, 112; Jones & Wheeler, 1989, 139). Rowley-Conwy (*op. cit.*, fiche 73) used the following calorific values: 3000 kcal / kg of sheep, cattle and pig, 1200 kcal / kg for horse, 3500 kcal / kg for seabirds and 700 kcal / kg for fish.

The relevance of the total number of calories thereby calculated depends upon the theory that in medieval Orkney people aimed to expend the minimum amount of energy to gain the maximum calorific yield (Colley, 1983b, fiche M102). In reality people may not have known the calorific values, and as Colley pointed out, social (or religious) factors may have been a more important consideration. As a method by which to gauge the relative contribution of marine produce to domestic species estimated total calorific values are useful but its application to the data in table 18 would simply reiterate what is already apparent, but not necessarily the case - that domestic species formed the basis of the diet.

4.3.2 Calibrating fragment counts between sites

The standard techniques described above do not allow for the influences of taphonomic processes. It is possible, however, to account for poor preservation and excavation recovery procedures by using simple equations (a and b), which determine the ENF (estimated number of fragments per m^3 of excavated soil and an index of preservation:

Shellfish, fish and bird bones

a) $\frac{\text{No. of fragments}}{m^3 \textbf{ sieved} \text{ soil}} = \text{ENF} / m^3$

Animal bone (including seal and whale)

a) $\frac{\text{No. of fragments}}{m^3 \text{ of } \textbf{excavated} \text{ soil}} = \text{ENT} / m^3$

b) Preservation factor = $\frac{\text{MNI x Total no. of bones in the original skeletons}}{\text{No. of fragments}}$

MNI = The estimated minimum number of individuals

The preservation factor calculated in b) is not only a guide to burial conditions and their effect upon the survival of bones, it is a general index to the various taphonomic processes previously outlined: hunting practices, consumption and use, discard, excavation collection procedures, since it makes the implicit assumption that whole skeletons came to the site.

The calculation requires information on the sampling strategy used to recovery different classes of environmental remains, the minimum number of individuals of each species, and the average number of bones in the skeleton of each species. Unfortunately the publication reports of the various sites were insufficiently detailed to reconstruct this information in all cases (table 19):

Information	Brough of Birsay	Buckquoy	Red Craig	Saevar Howe	South of Red Craig
MNI	/ (animals)	/	0	/	0
No. fragments	/	/ (not fish)	/	/	/
m^3 sieved soil (mesh size)	0	/ (none)	/ 5 (10mm)	/ 156 (5mm)	/ 2 (10mm)
m^3excavated	/ 210	/ 500	/ 36	/ 156	/ 65

/ = information present 0 = information absent

Table 19 Statistical information available in published excavation reports

I used the following recommended figures for the original number of bones in skeletons of different species: 400 for fish (based on a 64 cm cod in the reference collection at Durham University, Department of Archaeology); 200 for sheep, an adult cow, pig and seal (Stallibrass, pers. comm.) and 100 for a seabird (based on a black-headed gull in the reference collection at Durham university, Department of Archaeology).
Calculations for the various species and sites were as follows:

Species	Brough of Birsay	Buckquoy	Red Craig	Saevar Howe	South of Red Craig
	ENF / PI	*ENF / PI*	*ENF / PI*	*ENF / PI*	*ENF / PI*
Fish	1.3 / 66.7*	1.0 / 38.1 **	**60.4** / 66.7 *	10.6 / 37.7	**181.3** / 66.7 *
Animal (cattle, sheep, pig)	57.4 / **3.3**	13.3 / **3.5**	2.8 / -	2.5 / 13.6	75.6 / -
Seal	0 / 0	0.1 / 23.5	0.1 / 66.7	0 / 0	0.6 / -
Seabird	0.3 / -	0.9 / 11.2	0.03 / 100	0.2 / 41.2	1.4 / -

* Based on 6 bones = 1 fish (as at Saevar Howe) ** Bones collected by hand
PI = Preservation index (the lower the number, the better the preservation)

Table 20 Estimated fragment counts per m^3 of excavated soil and preservation indices

The results show clearly that the recovery, measured in ENFs, of fish bones was better at sites with sampling programmes, at Red Craig and South of Red Craig. The preservation (PI) of animals over fish, seabirds and sea mammals was most marked at Buckquoy and the Brough of Birsay. The recovery ratio of fish to animal bones varied from 2.5:1 at South of Red Craig to 44:1 at the Brough of Birsay. The remaining sites ranged

from 4:1 to 20:1. There are several possible explanations for this wide range. It may indicate the practice of quite different subsistence strategies at the two sites, perhaps related to their status. The Brough of Birsay was an Earldom residence. Inhabitants there may have eaten more beef, mutton and pork than their neighbours living on farms in Birsay Bay. It is considered likely (Seller, 1986) that jointed meat was supplied to the high status settlement at the Brough of Birsay, from neighbouring farms. This may account for the high ratio of animal to fish there. The fact that the meat was jointed has an effect on the ENF but this is accounted for in the preservation index.

The different ratios may simply be a result of more rigorous environmental sampling at South of Red Craig, or contextual variation of the material that derived from a settlement focus on the Brough, but the margins of a settlement South of Red Craig. The ratio of 4:1 at Saevar Howe, where all the soil was sieved, is perhaps more representative, although an unknown quantity of material was lost from the record in earlier excavations. The median differential between fish and animal bone in table 20 was 12 (13 for ENF and 11 for PI). For the sake of argument I will use this figure as a guide in interpreting numbers of individuals and fragment counts, i.e. all fish bone estimates are multiplied by a factor of 12 when comparing them to animal bone counts.

The estimated number of fragments per m^3 of excavated soil (ENF) calculated on column samples taken from midden deposits at Freswick Links, Caithness is much higher than those cited for sites in Orkney in table 20. A total of 8626 fish bones were recovered from eight samples at Freswick, representing a total excavated area of just 1.08m^3 in size, giving an ENF of 7987, forty four times larger than that for the site at South of Red Craig, Birsay Bay. These figures seem exceptional, but as stated above, the difference between Freswick and other sites may be no more than a combination of collection procedures, good preservation and the midden context from which the assemblage came.

The calculations of ENF and PI do not account for this "missing factor" - that material which never entered the archaeological record in the first place. The excavation at Hope Colony offers an indication of the size of this missing element since there documentary evidence stated exactly how many fish and birds were caught and how many domesticated animals there were. In terms of the numbers of individuals recovered during excavations within the settlement at Hope Colony 50% of domestic animals were represented, but only 0.007% of wild birds and 0.01% of fish bones (calculated on the basis of there being 100 salmon in a barrel and not including dried fish from Norway which would have been filleted before transport; see 4.2.1).

If, for the sake of argument, one were to assume that discard and recovery frequencies were similar in medieval Orkney the quantities of produce eaten would have been very different from the estimated minimum numbers of individuals shown in table 31.

For example, at Buckquoy there would be 234 animals, 460,000 fish and 714,300 birds. At Saevar Howe just 54 animals would be present, in contrast to 1,560,000 fish and 200,000 seabirds; and at The Brough of Birsay 334 animals and around 471,670 fish. In terms of the calorific yield this would be equivalent to 6,377,400 kcals from animals at the Brough of Birsay, and 82,541,725 kcals from fish (calculated using Rowley-Conwy's maximum estimated carcass weights and calorific values cited above for animals, but the minimum for fish). This is enough to feed 97 people for one year (based on a generous allowance of 2,500 calories per day). In reality the site was occupied for approximately 220 years during the Viking and Late Norse periods. The assemblage quantified here comes from approximately one twentieth of the settled area on the Brough. Based upon this assemblage, it can, therefore, be estimated that some nine people lived comfortably on the Brough during those 220 years. In reality this figure is probably higher, given that a large percentage of the site has been lost to the sea. This figure does also not account for cereals and vegetables in the diet and is spuriously accurate.

Similarly at Buckquoy animals would produce 35,400,000 kcals, fish 80,500,000 and seabirds a staggering 500,000,200 kcals, and that does not include any contribution to the diet made by shellfish or sea mammals. This is enough to feed 1.5 people for the period of occupation of the site. About half of the site at Buckquoy was excavated, so this figure can be doubled. Additional middens on the fringes of the settlement would have inflated this figure further, perhaps to four adults, a reasonable number to assume lived in the farmstead which had just a single dwelling house and a barn or byre in each phase of its occupation.

Of course, the figures calculated above would drop dramatically if representativity of fish and bird bones rose to just 1% of the quantity originally exploited. In that case the calorific yield of fish and seabirds at Buckquoy would be between 805,000 and 25,760,000 for fish, depending on their size, and 17,500,000 for seabirds, a yield that would still match that from domestic produce.

These figures do not prove anything, nor were they intended to, but they do demonstrate that some estimate of the "missing factor" is important in determining the nature of a settlement's economic base. The extent to which people processed food and dumped waste on beaches, in the sea, and away from settlement sites should not be underestimated. This is more likely to be the case where off-site activities such as hunting and fishing were concerned. It is clearly time to re-evaluate the evidence for the medieval subsistence base in Orkney. There is no reason to believe that subsistence was principally agrarian, based on cereal and meat production with some dairying. Indeed it seems more likely that fishing and hunting for seals, whales and seabirds were key activities.

The small quantities of marine resources recovered in Orkney represent the tip of an iceberg. The very fact that any of these fragile remains survives indicates a large-scale utilisation of marine resources in the Viking and Late Norse periods. This brings us back to the question raised earlier (4.1) - whether ubiquity of fish bones is necessarily the same as economic dominance. If a fishery, involving a trade in fish such as the later stockfish trade in Norway could be demonstrated in the Late Norse period, then the economic importance of marine resources would be evident. At present there is insufficient evidence to prove this, although there does appear to be an increase in marine resource exploitation through time. The final publication of excavations at Tuquoy may go some way to resolving this issue. That marine resources were important to the subsistence economy has been demonstrated, but it is not yet possible to draw any conclusions about its dominance in relation to terrestrial agricultural resources.

Summary

A diverse range of marine resources was extensively exploited in Orkney in the Viking and Late Norse periods. Fish, shellfish, sea mammals and birds provided food, bait for fishing, oil for lamps, feathers for stuffing, skins for clothing and bones for tools. Shellfish were gathered on beaches, seabirds were hunted on cliffs and fish and sea mammals were caught from the shore and from boats offshore. In addition to the faunal remains, marine resources included driftwood washed up on beaches, seaweed and even sand and shingle. All had their uses.

Quantifying the relative importance of marine resources to the subsistence economy is complex. Excavation of the seventeenth century settlement at Hope Colony, Greenland revealed that 50% of domesticated animals were represented in the archaeological record, but only 0.01% of consumed fish was recovered. This pattern is likely to be repeated in Orkney. The poor recovery of fish bones is due to a number of factors including original fishing and processing practices, consumption and discard, the inherent fragility of the remains and excavation recovery procedures. Nevertheless, a marked increase in the recovery of fish bones from Late Norse settlement sites was apparent. This may reflect an increase in fishing and other marine resource exploitation, possibly to supplement the diet on days of abstinence in the Christian calendar. Barrett (forthcoming) has suggested a similar explanation for the origin of fish bone middens at the Late Norse / medieval site at Robert's Haven, Caithness.

There is currently no satisfactory means of comparing the relative importance of marine resources and terrestrial environmental assemblages. Current research is tending towards reconstructing diet based on relative levels of trace elements in human bones, rather than developing quantification techniques to interpret faunal assemblages. The simple

quantification techniques outlined in section 4.3 allow comparison between faunal assemblages at near contemporary sites in Orkney. The results reinforce the thesis of this chapter - that marine resources were key elements of the subsistence economy, but are under-represented in the archaeological record.

How to ensure recovery

The objective analysis of the economic base of the islands in medieval times is only possible where there are suitable data. In order to maximise the availability of such data archaeologists need to adopt improved techniques of recovering and assessing marine environmental remains. In the first instance, an overall excavation strategy should include, wherever possible, an element of off-site analysis, that is the excavation of the waste associated with settlement sites and the location of new site types, such as the fish processing site found at Freswick Links, Caithness. Coastal survey is the most obvious means of revealing such sites. In the case of rescue excavations site selection is not always possible, although it should be possible to give priority to the margins of threatened settlements.

Secondly, directors of excavations need to devise a clear sampling strategy before the excavation begins. Ideally, a certain proportion of all contexts across a site should be sieved either as column or individual bulk samples. There is little point in doing this, however, if the mesh size used is greater than 5 mm. 3 mm is preferable for the recovery of smaller fish and bird bones. The wet sieving of clay soils should be requisite.

Quantification techniques need to be developed further to adopt methods that allow intra and inter-site analysis of the type outlined above since excavation and sampling strategies will inevitably continue to vary from site to site. As a minimum requirement all specialists reports should contain fragment counts by species, estimates of the minimum numbers of individuals, together with an explanation of the means by which these were derived and some consideration of preservation indices, contextual variability and calorific yields.

The indirect evidence of resource exploitation in the form of net weights, line sinkers, netting needles, net floats, line sinkers, hooks, gauge mesh-pins and harpoons merit more attention than they have received hitherto. Similarly the bone artefact assemblages should not be overlooked. Whalebone, for example, occurs more commonly as an artefact than it does in food waste.

I have so far considered the importance of marine produce only to the subsistence economy. It is necessary also to remember that surplus produce was required to pay taxes (see 1.1.1). At the time of the first written rental, at the turn of the sixteenth century, taxes

were still paid in kind, in butter, barley and malt. It appears that neither marine produce nor meat was used in payments, although admittedly the rentals record charges levied, rather than payments made. The production of a surplus would also facilitate the exchange of resources between islands. Inevitably, the production area required to meet an individual farm's needs would diminish as a result of the exploitation of marine resources, but there is no evidence of any pressure on land or labour that might have caused this situation. The apparent increase in marine resource exploitation in the late Norse period might be explained in terms of population pressure, an increase in taxes causing recourse to marine produce to meet domestic needs, the more effective exploitation of the local environment, changes to the diet following the introduction of Christianity or a growth in inter-island traffic and exchange. The material evidence for inter-island exchange and maritime communication networks is considered in detail in chapter 5.

CHAPTER 5 Networks of trade and communication in Viking and Late Norse Orkney

Introduction

The object of this chapter is to determine to what extent networks of trade and communication in operation in Viking and Late Norse Orkney relied upon the use of boats and ships to transport people and goods around the island group and further afield. Some of these craft have been excavated; these are discussed in chapter 6. This chapter is concerned with other direct and indirect evidence for trade and exchange in Orkney.

It is possible to distinguish in the archaeological record manufactured goods which are foreign to Orkney or foreign to the island or area in which they were found. This need not imply, however, that these goods were the objects of trade. It is not easy to distinguish from the archaeological record the underlying reasons for the movement of goods. Prehistorians and anthropologists prefer to use the term *exchange* rather than trade. The term implies the giving of something in return and whilst it may be unreasonable to assume that access to all resources in Viking and Late Norse Orkney was controlled, Samson (1991b) has argued convincingly that exchange in the Viking World was both socially-embedded and reciprocal.

In this chapter the analysis of materials found on Viking and Late Norse sites shows that exchange operated on three levels: long distance, inter-island and intra-island. Long distance exchange goods were imported to Orkney from outside the island group, from the Scottish mainland, Shetland and further afield. These imports included steatite (soapstone) for the manufacture of cooking pots and baking plates; certain types of wood, particularly oak and pine; precious metals, gold and silver; tin for making copper alloys as well as small quantities of amber, jet and pottery. Pumice is found on several sites and although foreign to Orkney it may well have derived from local beaches and is therefore not included under foreign goods. Similarly flint was available in Orkney, both in boulder clay deposits and probably on beaches.

The inter-island transport of local resources such as peat was discussed by Kaland in 1982. Her conclusions were, however, based largely upon analogy to recent practices rather than direct archaeological evidence. This thesis takes a different aproach. Since that article was written, several new excavations have been published and a more comprehensive analysis of inter-island transport is now possible. But it is possible also to draw on the evidence from unexcavated and unpublished sites. Broad based categories of information such as the approximate date, the range of materials found and site location should be sufficient to enable generalisations to be made about medieval trade and exchange. Of the 175 sites in the gazetteer (appendix 1) 134 contain this information. The original analysis presented in this chapter is intended to identify what manufactured goods and raw materials

were being exchanged and how this exchange is manifested in the archaeological record. Traditionally analysis of the economy in Orkney has been based upon the distribution and composition of coin finds, hoards and balances. A summary of the main findings of these researches is also presented in this chapter.

5.1 Models of trade and exchange

Several scholars have attempted to relate the perceived distribution of artefacts on archaeological sites to models of trade and exchange postulated by anthropologists. Renfrew (1975) identified ten modes of exchange (direct access, directional, down-the-line, reciprocal, freelance and prestige-chain etc.) from graphs showing fall-off patterns of the quantity of imports from their source. This technique relies upon the assumption that the quantity of material which was lost or buried, and subsequently excavated, closely relates to the intensity of its original circulation (Huggett, 1988). Many of the imports found in Orkney were deposited as grave goods. Clearly a number of factors might influence their deposition, not least their social significance as heirlooms and prevailing burial customs. Furthermore, Hodder & Orton (1976, 186ff) demonstrated that different exchange processes can result in the same form of fall-off curve. Nevertheless the technique is still used (Huggett, 1988). Unfortunately the material evidence for exchange in Orkney is not sufficient to allow quantification. It is not possible therefore to test exchange models by any statistical technique. Renfrew's analysis does, however, provide a useful framework within which to discuss possible modes of exchange in Orkney. In addition to those forms of transaction outlined by Renfrew there are several others worthy of consideration here: barter, marriage, warfare, alliance, diplomatic gifts, tribute, redistribution and market exchange. Some of these modes of exchange operated in Orkney in the Viking and Late Norse periods.

Direct access

Direct access implies no exchange, although it still involves the transport of goods. Resources could be procured directly, from some distance, without reference to any other party. This must have been the case with land which had no recognised owner, or which was considered to be public. Upland regions on Hoy, in western Mainland and on Rousay, and the sea may have belonged in this category. Reconstructing the ownership of say fishing rights, the collection of peat or deer hunting is impossible on the basis of archaeological evidence alone and is an area for documentary research.

Reciprocal exchange (marriage, warfare, alliance, diplomatic gifts)

This might be conducted at home or at some common boundary. It was likely to be socially-embedded and may have operated through kinship groups or social groups. Viking and Late Norse society was strictly hierarchical, roughly comprising the king of Norway, various earls including the Earls of Orkney, the Earls' men (ON *hird* or *goeðingar*), the bonder (ON *bóndi* or common people) and slaves. The *Orkneyinga Saga* alludes to the practice of *gift exchange*, for example the King of Norway giving ships to the earls, in return for which he

presumably had their continued political allegiance. Valuable objects such as arm-rings and neck rings which frequently occur in hoards might have been used as payment in social transactions of this nature (Gaimster, 1991).

Down-the-line exchange, tribute and redistribution

Such a method of exchange, where commodities moved from one area to another through successive exchanges may be evidenced in the ingots and hacksilver found in many hoards. Several examples have nicks where the purity of the silver was tested in each transaction.

Saga evidence (*Orkneyinga Saga*, chapter 30) suggests that Earl Thorfinn and his father Harald Sigurdson imposed a *tribute* on the Earldom, including Orkney, to raise a levy of men and ships (ON *leidang*). Crawford (1987: 83f) presented evidence of an assessment system in the Northern Isles based on land ownership and divisions, which was the basis of this taxation. The earls' lands (ON *bordland*) were free of tax. (The location of these can be reconstructed from the first rental of 1497, where they are listed as "auld earldom" properties [Peterkin, 1820]). Remaining land, excepting military huseby farms (the identification of these is questioned by Morris, pers. comm.) was taxed, initially in kind and later in money. The issue of taxation (ON *skat*) is an area of much debate. Assuming, however, that such a system was in operation throughout the medieval period then there were two more forms of exchange - *tribute*, the collection of taxes, and its *redistribution*.

Market exchange

It is generally agreed that the in the early Viking period hacksilver and foreign coins were treated as bullion and measured by weight. From the end of the 10th century in Scandinavia coins became more prevalent and mints were established, but to judge from the variation in their weight these were still weighed in transactions (Blackburn [ed.] 1986). After the mid eleventh century the coinage was more standardised. There was never a mint in Orkney, or Scotland for that matter where settlement was essentially rural, though mints were established at Dublin and York. Graham-Campbell (1993) amongst others has argued that the arm-rings and neck-rings commonly found in hoards in Scotland were a sort of primitive money 'ring-money' which would be used in commercial transactions in place of coins and most if not all trade was conducted by traders seeking to exchange goods rather than merchants aiming to make money (Samson, 1991a).

Market exchange need not necessarily imply the use of coinage and bullion, but undoubtedly in many cases it did. Goods were also bartered. Prices might be fixed according to supply and demand. The establishment of standard weights was crucial both to the collection of *tribute* and in market exchange, if not in other means of exchange.

Informal markets and central places where transactions were conducted can be identified in the archeological record. The harbours at Kirkwall, possibly Pierowall, and various informal beach markets, for example at Tuquoy and Pool, probably operated in this way. *Things*, assembly places which acted as law courts, may also have served as markets. People travelling from different islands to attend meetings might logically have brought goods with them to exchange at a market. To date, however, no such site has been systematically excavated and it is impossible to provide evidence for this claim.

5.2 The transport of raw materials and manufactured goods

Inevitably any study of exchange patterns involves establishing the distribution of the objects involved. In the analysis presented here I have divided the materials represented on each of the gazetteer sites into the following categories: stone, wood, lime (mortar and render), clay (bonding of stone structures), pottery (imported and indigenous), glass, iron, lead, steatite, coins, silver, gold, amber, jet, copper alloy, peat, marine and animal remains and recorded their presence or absence. The selection of the categories is discussed below. Absence here means either where the material was definitely not recovered or where it had simply not been recorded, since it was usually impossible to distinguish the two. In the following statistical analyses only values of goods recorded as present are used and the order or ranking in which goods appear is considered alongside percentages. The data are not good enough to assess the relative quantities of the different materials on different sites but the recorded frequency with which materials occurred on sites produced interesting results.

Clearly the selection of the material categories was critical to the whole analysis. Since the analysis depends upon the identification of raw materials, products were broken down as far as possible into their constituent commodities - instead of *jewellery*, for instance, there is *gold*, *silver*, *jet*, *amber*, *copper alloy* and *bone*. Chemically altered materials such as pottery and glass were not broken down into their formers, tempers and modifiers, although the provenance of these was considered in the analysis. On the other hand in the absence of any further evidence of source, textiles were simply categorised as plant or animal remains as appropriate.

Survival rates of the various materials were inevitably affected by preservation factors, recovery procedures, and site type, and the influence of each of these factors was considered in the analysis. These are discussed in the next section.

5.2.1 The data and their limitations

The data presented in appendix 4 derive from the gazetteer. The materials were divided into two groups: those which were indigenous to Orkney and those which must have been imported, either in their final form or as a raw material. The frequency with which these materials occurred on all gazetteer sites was recorded as a percentage on figure 40. Stone, both artefactual and structural, was the most common material found on 26% of gazetteer sites. Marine remains, including shellfish, fish, seaweed and pumice etc., and animal remains, both ecofactual and bone re-used in artefacts occurred at 11% of sites. Metals (iron, lead and copper alloys) ranked more highly than pottery, steatite and glass, and the frequencies of all other materials represented were low. These relative frequencies are, of course, greatly affected by conditions of preservation and recovery procedures.

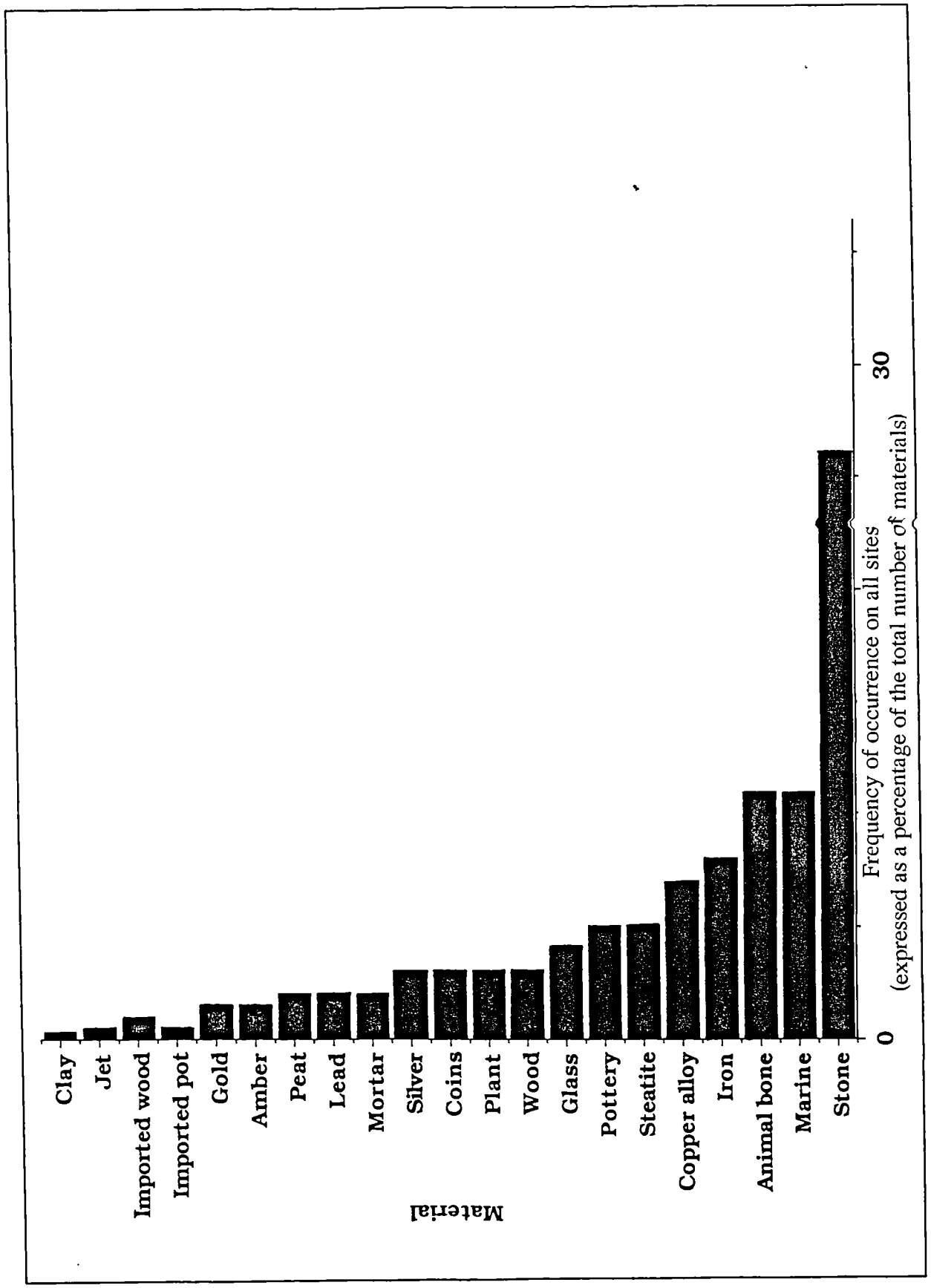


Figure 40 Classes of material found on gazetteer sites

Preservation

The survival rate of different materials is, of course, affected by their physical and chemical properties and those of the burial environment, in particular the presence or absence of oxygen, acidity and alkalinity levels and water content. Waterlogged anaerobic conditions, for example, are conducive to the preservation of organics. In average dry-land conditions one would expect flint, pottery, stone and glass to survive best, followed by carbonised remains, bone and shell, with smaller percentages of antler, iron and invertebrates. The quantities of copper alloys would be lower still and organics, such as wood, plant remains, skin, basketry and textiles, would be the least well represented (figure 41). In wetland or underwater conditions, the percentages would vary, although the order would remain largely unchanged. Similarly the pH of the soil influences preservation. Nevertheless the order represented in figure 41 can be used as a guide to show the ranking of material groups which would result if preservation were the *only* factor governing recovery. Therefore only the order in which materials survive is of importance. The percentages presented in figure 41 were calculated on the basis of the survival of finds on wetland sites in the Somerset Levels compared to dry land sites from the same period.

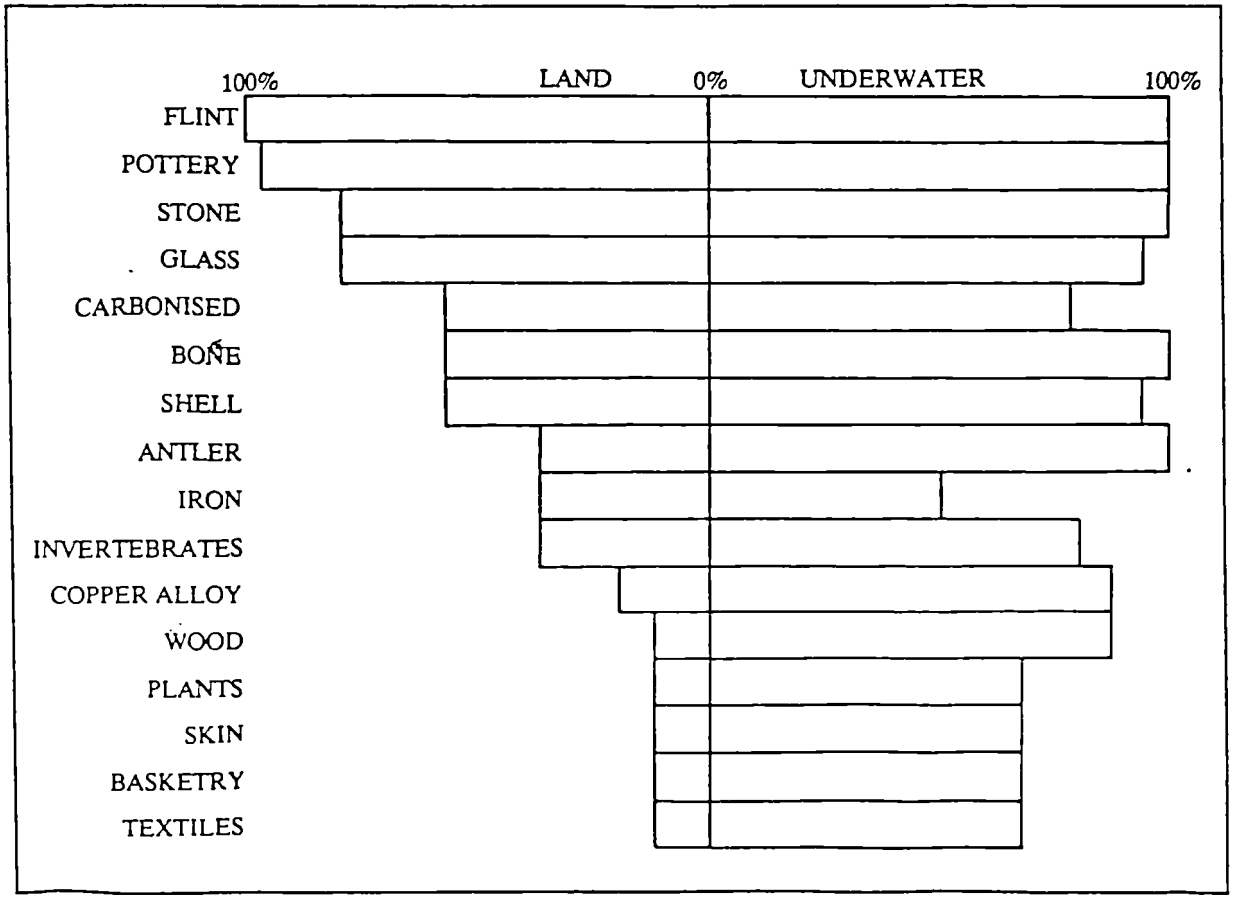


Figure 41 Preservation of materials in wet and dry conditions (after Dean *et al,* 1992, 31)

In terms of preservation the high survival rate of stone in figure 40 is hardly surprising, but the relative frequencies of pottery, steatite, gold, amber, jet and silver found on sites in Orkney are lower than one would anticipate if preservation were the only factor affecting their recovery. The frequency of both metals and shell are within the anticipated range, but carbonised remains, ie. plant, peat and wood are under-represented. This is probably a bias of recovery practices.

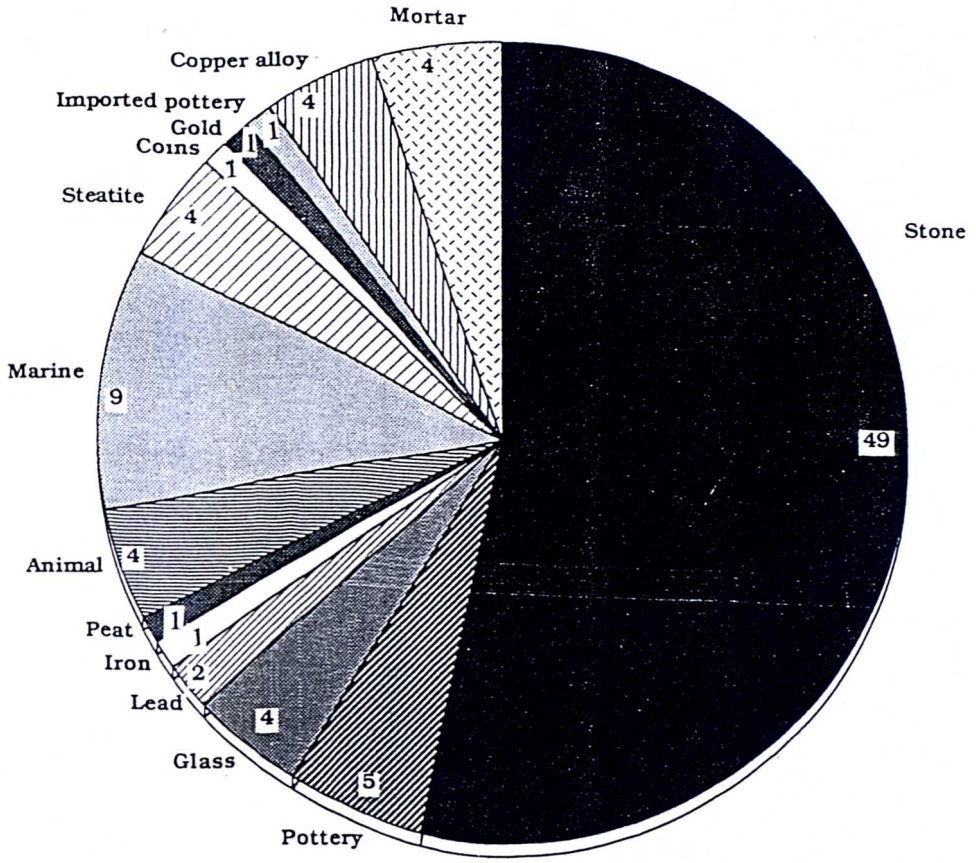
Recovery procedures

It is difficult to account for recovery biases except on a general level in terms of the relative visibility of material and, of course, this will vary according to the size of artefacts, the experience of the excavator (for example in recognising steatite), the excavation tools used and conditions of discovery and/or excavation. The remains of small mammals, fish, shellfish and insects will often only be recovered if a sampling strategy including flotation, wet sieving, and dry sieving is in operation, similarly for carbonised plant remains.

Figures 42 and 43 distinguish the occurrence of material categories on excavated and unexcavated sites derived from the gazetteer. I use the term "excavated" loosely, since it incorporates 19th-century discoveries of graves. The results reflect the fact that several sites are standing monuments and ruins which have been discovered but not excavated with stone, mortar, clay bonding and middens being virtually the only materials recorded in any significant numbers on unexcavated sites. Plant remains and organics are under-represented and not surprisingly they occur only on excavated sites. On the other hand marine remains in the form of middens are highly visible. This reveals the number of sites exposed in cliff sections through marine erosion, and perhaps also the importance of seafood in the medieval diet and the use of midden material in house construction.

Site type

Having established that preservation factors and recovery procedures are not the only factors governing the survival of materials it is now possible to consider the relationship between site type and the range of materials recovered. The materials were considered according to the categories established in chapter 2 (figure 44: A = settlement, thing, castle; B = isolated finds, hoards, runes; C = maritime structures; D = burials, cemeteries; E = Chapel, ecclesiastical sites; F = Industrial; figure 44).



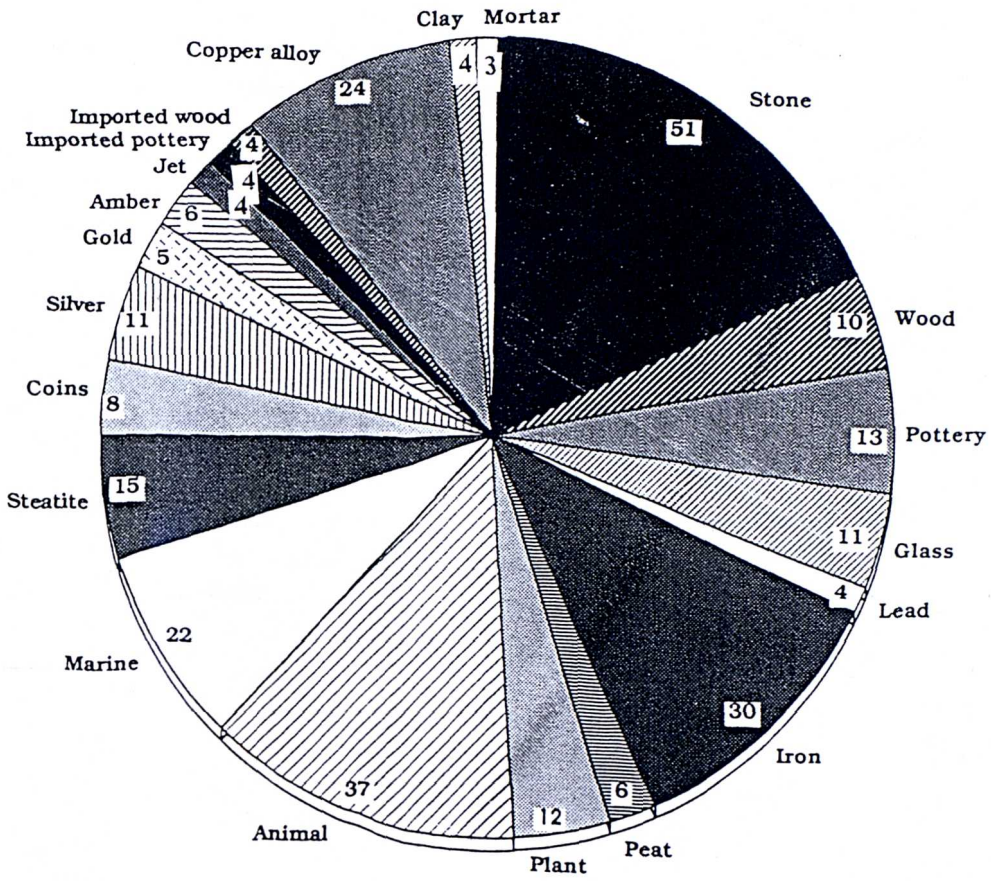
Ranking
Stone (49)
Marine (9)
Pottery (5)
Animal, glass, mortar, copper alloy, steatite (4)
Lead (2)
Peat, iron, coins, gold, imported pottery (1)

No wood, plant, silver, amber , jet, imported wood or clay found

Total no. of materials = 92

Numbers indicate the frequency of occurrence of these materials

Figure 42 Recovery of materials from unexcavated sites



Ranking
Stone (51)
Animal bone (37)
Iron (30)
Copper alloy (24)
Marine (22)
Steatite (15)
Pottery (13)
Plant (12)
Glass, silver (11)
Coins (8)
Amber, peat (6)
Gold (5)
Lead, imported pottery, jet, clay (4)
Mortar (3)

Total no. of materials = 277

Numbers indicate the frequency of occurrence of these materials

Figure 43 Recovery of material from excavated sites

The results are as might be expected. Settlements show the whole range of locally manufactured and imported goods. By their very nature isolated finds exclude structural materials and plant remains which would be discovered in systematic excavation. Few maritime structures have been excavated and those that have contained few finds: only stone, peat, iron, marine and animal remains. No foreign goods have been recovered from a maritime structure. These, not surprisingly, are most common in burials, with the exception of steatite which has a utilitarian, domestic purpose and is therefore more commonly found on settlement sites. There are also other functional differentiators - no mortar, clay or plant remains have been recovered from graves, except where they were incorporated accidentally. Copper alloys are found both in settlements and graves, but in the latter they are restricted to jewellery, especially brooches. Little copper alloys and surprisingly little metalwork in general have been found on ecclesiastical sites, although silver and coins rank highly. Steatite does not appear. This may reflect their status. So far as industrial sites are concerned too few are known to draw any firm conclusions.

5.2.2 Access to resources: long distance and inter-island transport

The division between goods foreign to Orkney and those which could have been manufactured in Orkney based on the distribution of raw materials (figure 45) is easily distinguished. The nearest source of steatite is on Shetland. Outcrops occur in a number of places on the Mainland, Fetlar and Unst and medieval steatite workings have been identified at Cunningsburgh, near Lerwick and Clibberswick on Unst. It is not yet possible to provenance steatite accurately and in any case this has not been attempted on the material from Orkney, so it is not clear which source was being exploited.

There was no mint in Orkney but English Scandinavian and Arabic coins have been found there. The significance of these is considered below.

As there was no local supply of oak and pine this timber may have been imported from Scandinavia or the Scottish Mainland. There is written evidence for the import of timber to Orkney from Norway in the later Middle Ages. During the 16th and 17th centuries boats were also imported into Orkney from Norway. Customs accounts from Bergen for the year 1566-7 report the export of thirty five boats from the boat building districts south of Bergen, of which twelve went to Orkney (Thowsen, 1969, 148). Boards, ready-made planks for use in building houses and boats, and tar were also exported to the Northern Isles from Norway at this time and may also have been reported in the Middle Ages. The *Orkneyinga Saga* contains references to earls and chieftains going to Norway to get new ships and receiving them as gifts (Chapters 67, 85, 90).

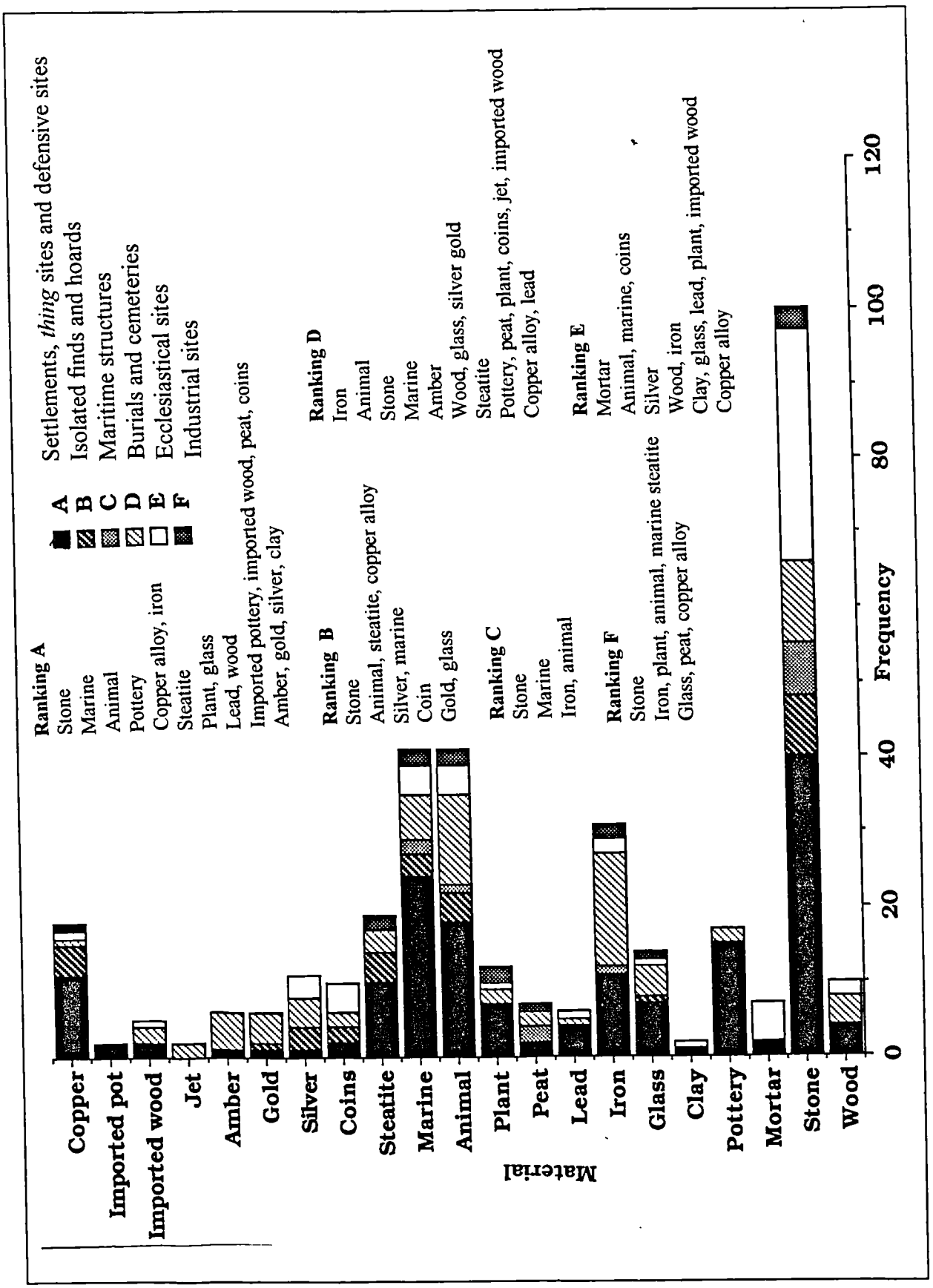


Figure 44 Frequency of material by site type

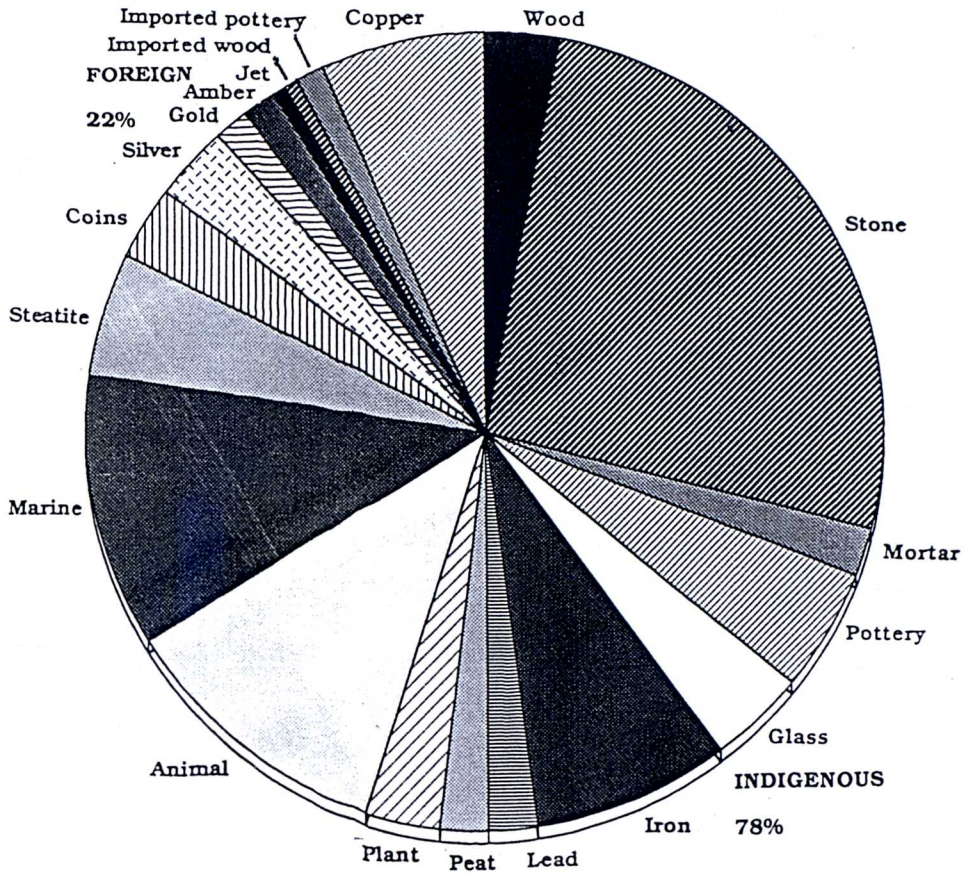


Figure 45 The origin of material in Orkney

A single sherd of green lead-glazed wheel-thrown pottery was found on the Brough of Birsay (Hunter, 1986b, 183) and 12th and 13th century Dutch wares were among the assemblage from Pool, Sanday. At Tuquoy, Westray there was a small collection of medieval pottery originating from "several European countries, as well as from other parts of Britain" (Owen, 1984, 54). It is not clear by what means these arrived on sites.

The origin of the precious metals and stones is less clear. Amber and jet appear in such small quantities in Orkney that they may have been chance discoveries on the beach but clearly this was not the case with the silver and gold found in graves, settlements and hoards.

The extent to which people relied upon sea transport is immediately evident if one groups the exploitation of marine resources with the occurrence of foreign goods. 28% of the material groups found on gazetteer sites arrived by sea. To this we should also add a figure for those items which were the subject of inter-island transport. The identification of these is a little more complex.

The uneven distribution of natural resources through the island group means that the inter-island transport of goods was a pre-requisite (figure 46). Resources might also have been transported by sea to avoid a long journey overland or to avoid steep terrain. The evidence of recent practice may be used to determine when this happened (figure 45).

Peat

Being a major source of fuel, peat was an important commodity. In living memory Eday and Hoy exported peat to neighbouring islands. On Stronsay, adjacent to the only peat beds on the island, and next to the only landing place for a kilometre I discovered a ballast site during survey work in June 1993. It is the first to be identified in Orkney and probably results from boats arriving with ballast to be off-loaded and replaced with a cargo of peat. Unfortunately there is no dating evidence for the site.

A recent article in *Current Archaeology* (133:34) based on the work of Stephen Carter and Rod McCullagh at AOC Scotland challenges the assumption that peat was a common fuel in medieval times. Thin section analysis of midden deposits can now distinguish between the ash of peat, turf and organic muds. Examination of so-called peat ash from several Scottish archaeological sites has shown little resemblance to peat ash produced in the laboratory. Midden deposits from Norse levels at St. Boniface, Papa Westray suggested a range of organic sediments were used as fuel. The major components were lacustrine mud and turf. This has been corroborated by analysis of the diatoms in the midden samples. Kaland (1982, 89) suggested that seaweed was also used as fuel. In considering the sources of peat one must also account for peat beds which are no longer present, either because they have been exhausted or reclaimed (Crawford, pers. comm.). Recent historical sources may reveal areas where this is the case.

There are only seven sites where peat has been identified with certainty. Inter-island transport may be suggested for four of these sites - around Birsay Bay and a site on Sanday.

Iron ore

There are only two sources of iron ore on Orkney, on Hoy at the Bay of Creekland and the Candle of Sale, although iron could also have been produced from bog iron and river gravels. The exploitation of the ore in the Bay of Creekland is probable, although no site has yet been found. Hoy also had the advantage of having the largest local supply of timber and peat for fuel in the smelting process. Based on values for iron in a modern geochemical atlas (Institute of Geological Sciences, 1978, map 10) bog iron might also have been produced on Eday, Stronsay, Westray, Sanday, Shapinsay, Rousay, Egilsay, Burray, South Ronaldsay, Birsay, Stromness and Orphir. However, it was not available on North Ronaldsay, Wyre, South Walls and Flotta. Using this information the only gazetteer site where the inter-island transport of iron need be postulated is Cobbie Roo's Castle on Wyre.

Lead

Lead occurs naturally at several places on Mainland and on South Ronaldsay, Graemsay, Rousay, Sanday, Stronsay, Shapinsay and Fara. Five gazetteer sites have produced lead objects and at three of these (the Brough of Birsay, Tuquoy and Buckquoy) the lead must have been imported.

Copper ores

Copper occurs naturally on Burray, Rousay and Sandwick. The manufacture of any copper alloy with tin involved the import of that metal from outside of Orkney, but in at least 23 cases the copper ore must also have been brought in from elsewhere in the island group.

Wood

Species indigenous to Orkney in the medieval period included willow, aspen, hazel, birch and alder. Larch and spruce might be available in the form of driftwood but pine, oak, ash, maple and elm must have been imported. Unfortunately, there are insufficient detailed pollen studies covering the period to determine whether any of the native species were the subject of inter-island trade or transport.

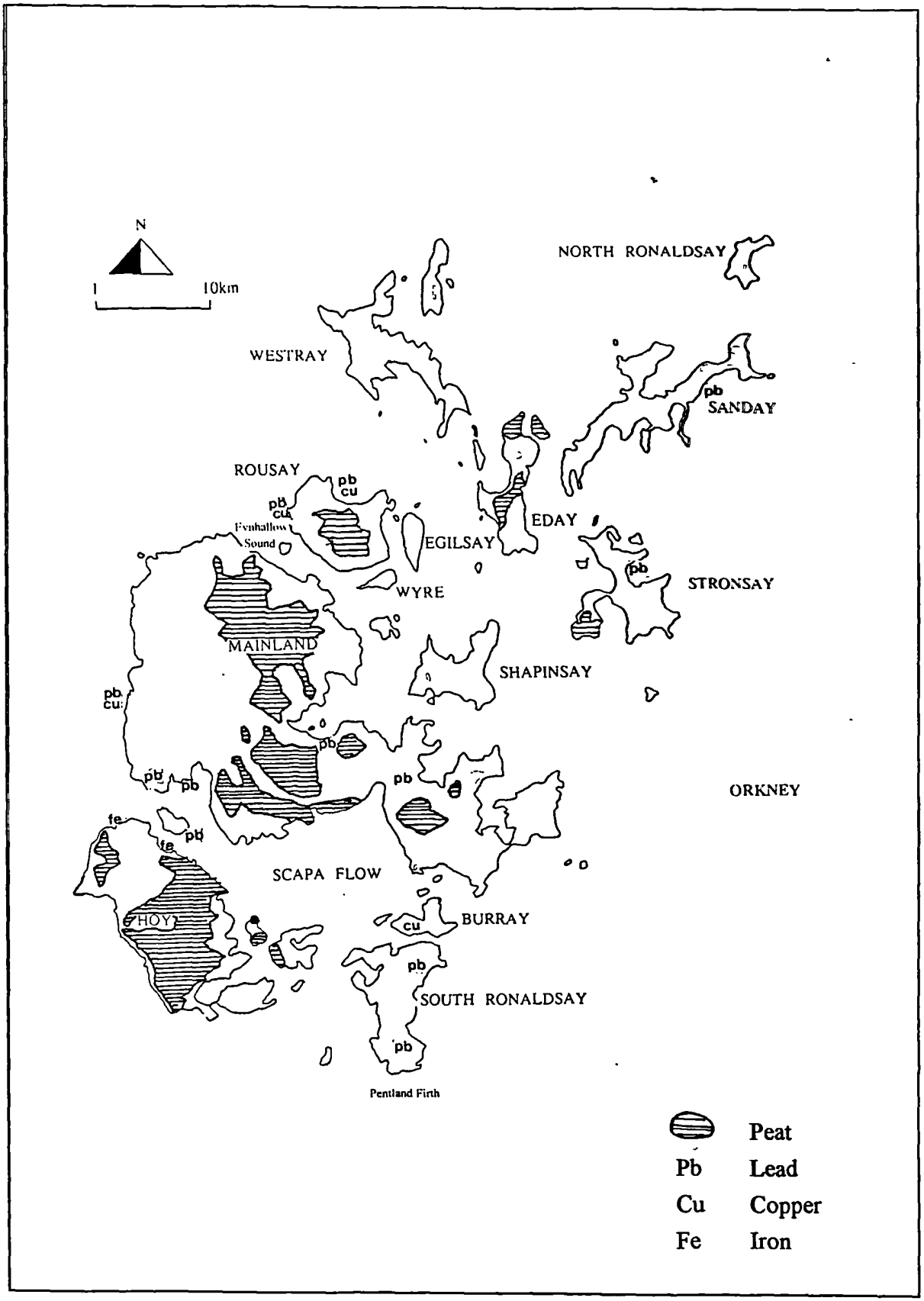


Figure 46a Distribution of natural resources (overlay)

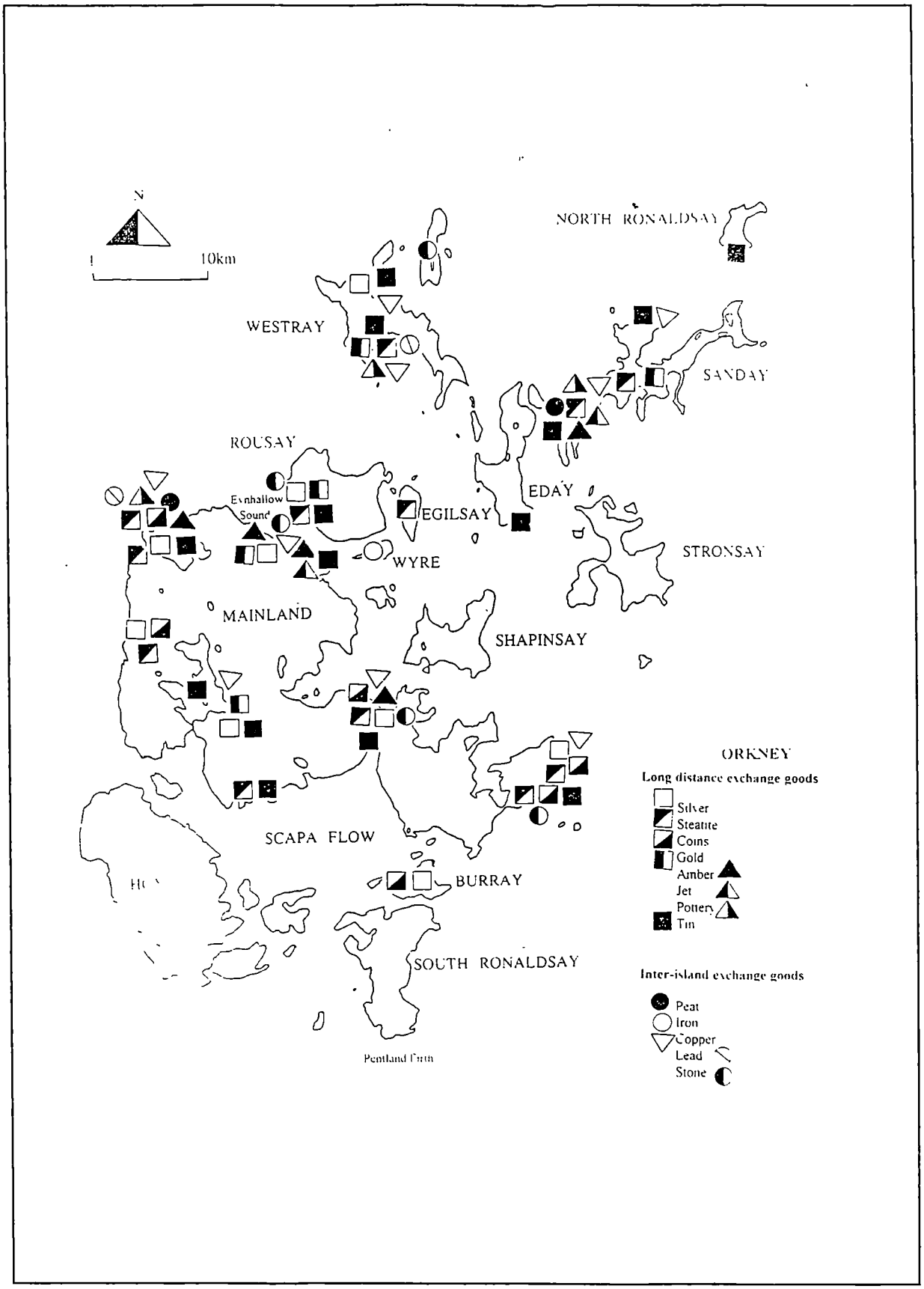


Figure 46 Distribution of exchange goods

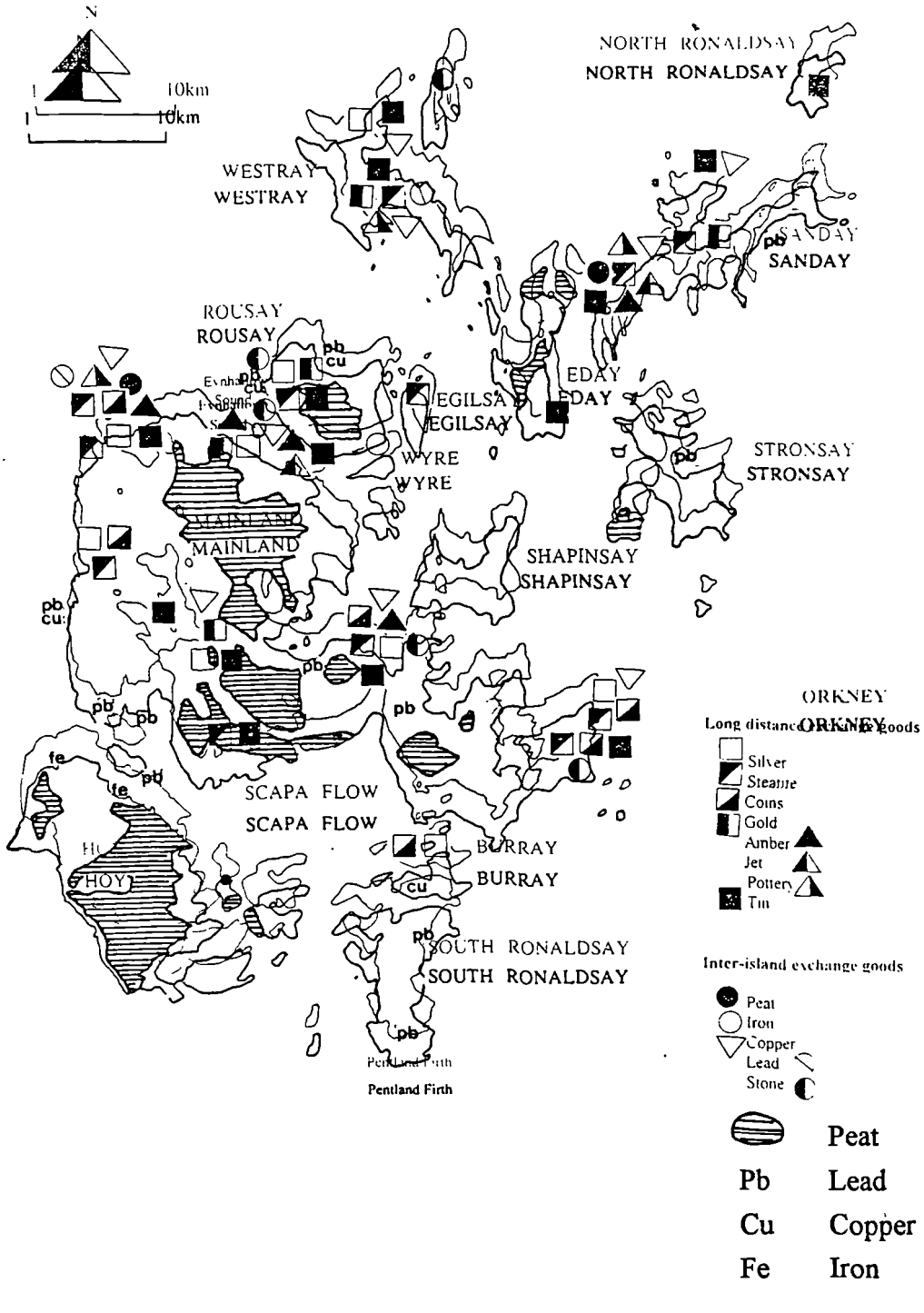


Figure 46a Distribution of natural resources (overlay)

Figure 46 Distribution of exchange goods

Stone

Although stone artefacts are usually analysed petrologically, the same is not always true of buildings and it is assumed that they are made from local sources. Unfortunately small artefacts such as line sinkers, thatch and loom weights pot lids, whetstones and spindle whorls might be made from beach pebbles, which although foreign to the local geology were nevertheless locally available. The following consideration of inter-island trade in stone is therefore restricted to structural and architectural pieces. A re-evaluation of sites in the field, particularly chapels rather than domestic structures might reveal more sites to which stone was imported.

Flagstone was readily available throughout Orkney, but stone was imported for special constructions such as St. Magnus' Cathedral and the Bishop's Palace in Kirkwall. A medieval jetty discovered in Kirkwall (McGavin, 1982) produced offcuts of freestone from the Eday beds of old red sandstone rather than the grey Rousay and Stromness flagstone which underlies Kirkwall Bay. The jetty was apparently purpose built to import the stone used in the construction of the Cathedral. Similarly five hogback tombstones (Lang, 1974) found scattered between the Mainland parishes of Kirkwall, Rendall, Deerness and the island of Papa Westray were all constructed of old red sandstone from Hoy. This type of monument actually originated in North Yorkshire in the early tenth century, spreading then to Scotland. Its introduction to Orkney must have come through contact with one or both of these areas. Lang's study of hogbacks (*op cit*) found that their distribution is concentrated along the east coast, implying that they were transported by sea.

A group of elaborately-carved architectural pieces is situated on Eynhallow and at Trumland House close to the sites at The Wirk and St. Mary's Church, Westside, Rousay. These were all carved in a red sandstone freestone probably of the Eday series. The architectural style is similar to that found in St. Magnus Cathedral and has been variously ascribed a thirteenth and sixteenth century date (Lamb, 1982).

An additional stone import was schist, found at the Norse mill at Orphir (gaz. no. 099; Morris pers. comm.). Schist was commonly imported to England from Scandinavia (Richards, 1991, 87).

Pottery / clay

Where pottery fabrics have been studied, the pottery which is handmade has been interpreted as being locally produced using a grass- or in a single example from the Brough of Deerness, shell-temper (Curle, 1982, 121; Hunter, 1986b, 183; Williams, 1987, fiche 4: 95). Perhaps, however, the issue of inter-island trade has not been considered and handmade has been seen as reflecting on-site production. At the Brough of Deerness four different fabrics were identified but petrological analysis could only identify them as local, or

rather Middle Eday Sandstone deposits. The same beds are found on Sanday, Eday, Stronsay, Shapinsay, Mainland, Burray, South Ronaldsay, Flotta and South Walls, ie. anything but local.

At the moment, therefore, pottery does not contribute to the picture of inter-island trade, except in the case of types foreign to Orkney although further research may alter this. No-one has yet attempted to source the clay-bonding found in some structures.

Glass / lime mortar

Twelve sites have produced glass, usually beads, with only two possible instances of vessel glass. The composition of these objects has not been analysed but it seems that they were made locally, possibly with the exception of vessel glass. All the sites concerned are coastal and lie close to supplies of a range of suitable formers and modifiers, ie. quartz in sand and potassium, calcium and lead oxides from wood or plant ash, lime in sand and lead ore, respectively.

Lime mortar was used in the construction both of chapels and secular structures at least six sites. It was probably derived from local shell sand.

Other goods

Foodstuffs such as cereals and meat, possibly on the hoof, may have been transported to some sites. At the Brough of Birsay cereals and meat were brought to the site from neighbouring farms in Birsay Bay where the animals were raised and slaughtered (Hunter, 1986). This is evident from the composition of the faunal assemblage which represented only *joints of meat and can be assumed from the small size of the Brough which* was too small to support livestock and crops. In the 16th century Orkney exported grain to Iceland, and in the 17th and 18th centuries to Norway. The 13th-century *Islendinga Saga* refers to the export of flour to Iceland (Magnússon, 1992).

There is some debate (Hunter, 1985) over whether the antler found on sites in Orkney came from indigenous deer, or were trophies from hunting expeditions to Caithness, like those referred to in the *Orkneyinga Saga*. Deer bones from parts of the skeleton other than those representing joints of meat are also found, so it seems likely that some deer at least were native, though it is also possible that joints of venison were being brought back to the islands. It is a prestige meat which keeps well.

It is possible that textiles were subject both to inter-island and long distance trade. So far only four sites have yielded textile remains and from these there is currently no reason to suggest anything other than local manufacture.

Of course there must have been transport in many more items - not all of which are detectable archaeologically including (to judge from documentary sources): slaves, spices,

oils, furs, craftspeople, art styles, and music. Outside influences governed the design and construction of St. Magnus Cathedral, Cobbie Roo's Castle and the Rounch Church at Orphir. Some of these came from Durham. Other connections with England are explored in the volume edited by Crawford (1988) and are evidenced in the *Orkneyinga Saga* (Jesch, 1993). Norwegian inspiration is seen in the style of Cobbie Roo's Castle on Wyre.

Coins and hoards

Of all the materials found on sites in Orkney only silver occurs in sufficiently high quantities as coins, hacksilver and jewellery in hoards and graves to enable analysis of its function within the exchange system. There was no medieval mint in Orkney and no indigenous source of silver. Metallurgical analysis of both ingots and ring money from the Skaill and Burray hoards demonstrated the exploitation of a range of silver sources, probably including Anglo-Saxon and Arabic coins (Kruse, 1993). Orkney boasts two of the largest hoards from all of Scandinavia - at Skaill (8 kg) and Burray (1.9 kg). The size of the hoards reveals no small measure of wealth in the islands and analysis of these suggests that the silver circulated as bullion with limited exchange involving coins and ring-money.

Five hoards deposited in Orkney between the late tenth and early eleventh centuries contained ingots, ornaments, hack-silver (fragmentary coins and silver objects) and "ring-money" (plain pennanular arm rings which conformed, for the most part, to a standard weight of 24 +/- 0.8g [Warner, 1976]). Crawford (1987, 133) amongst others has suggested that ring-money acted as a sort of currency. The silver ingots found in hoards often have nicks made in antiquity, presumably to check silver purity. Kruse (1993) suggests that the number of nicks bears a direct correlation to the circulation of the ingot.

Stevenson (1986) noted a distinction between ninth-century and tenth-century coin finds in Scotland. Early coins were often pierced, to be worn as pendants, whereas in the tenth century this practice ceased, perhaps, he suggested because such treatment would limit the monetary or exchange value of the coins. The numismatic evidence therefore suggests that there may have been at least some direct exchange in coins, alongside the metal-weight economy referred to above.

The importance of the sea in trade and exchange in Viking and Late Norse Orkney is evident in the foregoing discussion. At least 32% of all material (occurring on 32% of sites) arrived at sites as a result of inter-island or long distance exchange, whilst up to 68% of material at 90% of sites was locally derived. In fact this ratio may be closer since inter-island trade is probably under-represented. Organic products like wood, leather and peat have gone largely undetected and pottery has proved difficult to provenance.

It is difficult to draw any firm conclusions about the nature of exchange from the rather scant evidence, but it is possible to distinguish between (a) items of regular and (relatively) high volume and (b) those of low volume, intermittent, but possibly high value exchange. Copper alloys and steatite are the most commonly occurring items both of which were the objects of long distance trade. Occurrences of imported pottery and jet, on the other hand, were particularly rare. Items of gold, silver, amber, imported wood, stone and coins occupied the middle ground and might best fit category (b) above, ie. items which were exchanged infrequently and were consequently of high value.

5.3 Trade routes

Locations where exchange was being carried out can be identified by quantifying material by mode of transport and by area compared with the distribution of key natural resources (figure 47). The figures shown in the graph derive from at best only five or six sites and this limitation should be borne in mind when they are considered. The discovery in any of the areas of one or two new sites with different proportions of foreign and local goods may change the results presented here.

At Kirkwall and Stenness the proportions of foreign goods was the same as good derived from inter-island and locally exchanged goods. Determining the meaning of the proportions of materials is difficult, particularly since the context of many of the finds is unknown. Most were from hoards or isolated finds found in the nineteenth century. Assuming that the proportions of material surviving in the archaeological record represent its original circulation (and this is by no means certain) then this pattern implies that both places were production and exchange centres. Certainly this is not surprising in the case of Kirkwall which was the centre of the earl's court. Both places had access to peat and lead, but not copper or iron and this may account for some of the goods which were imported. At Kirkwall stone was also imported for the construction of St. Magnus' Cathedral.

Additionally, more than 10% of material was imported through inter-island trade at Deerness and Birsay. Birsay did not have local supplies of key resources such as copper, lead and peat and this together with the special nature of the site on the Brough as the earl's residence at the beginning of the Viking period probably account for the level of inter-island transport.

Long distance transport accounts for more than 20% of the materials found on Sanday, Westray, Rousay and Sandwick and this may reflect several things - the distribution of high status settlements receiving these, for the most part, luxury goods; a higher population density in these areas or just the amount of excavation which has taken place there. The Skaill hoard comes from Sandwick but none of the other areas has produced either hoards or coins. Inter-island transport is particularly low on Stronsay, Rousay and Sandwick. This might suggest that these areas were self-sufficient. Rousay and Sandwick have local sources of iron, copper, lead and peat. Stronsay has lead, peat and iron, but no copper.

Figure 48 compares modes of transport according to site location, coastal, inland, lochside. Approximately 41% of materials found on inland sites are the products of long distance or inter-island trade. The range and type of materials recovered also varies according to site location. The largest range occurs on coastal sites. Most of this material also reaches inland sites, but not, perhaps surprisingly, lochside settlements. This may be the

result of poor excavation in that area. The range of site types in each area is similar, although no maritime structure or industrial site has yet been found in the lochside zone.

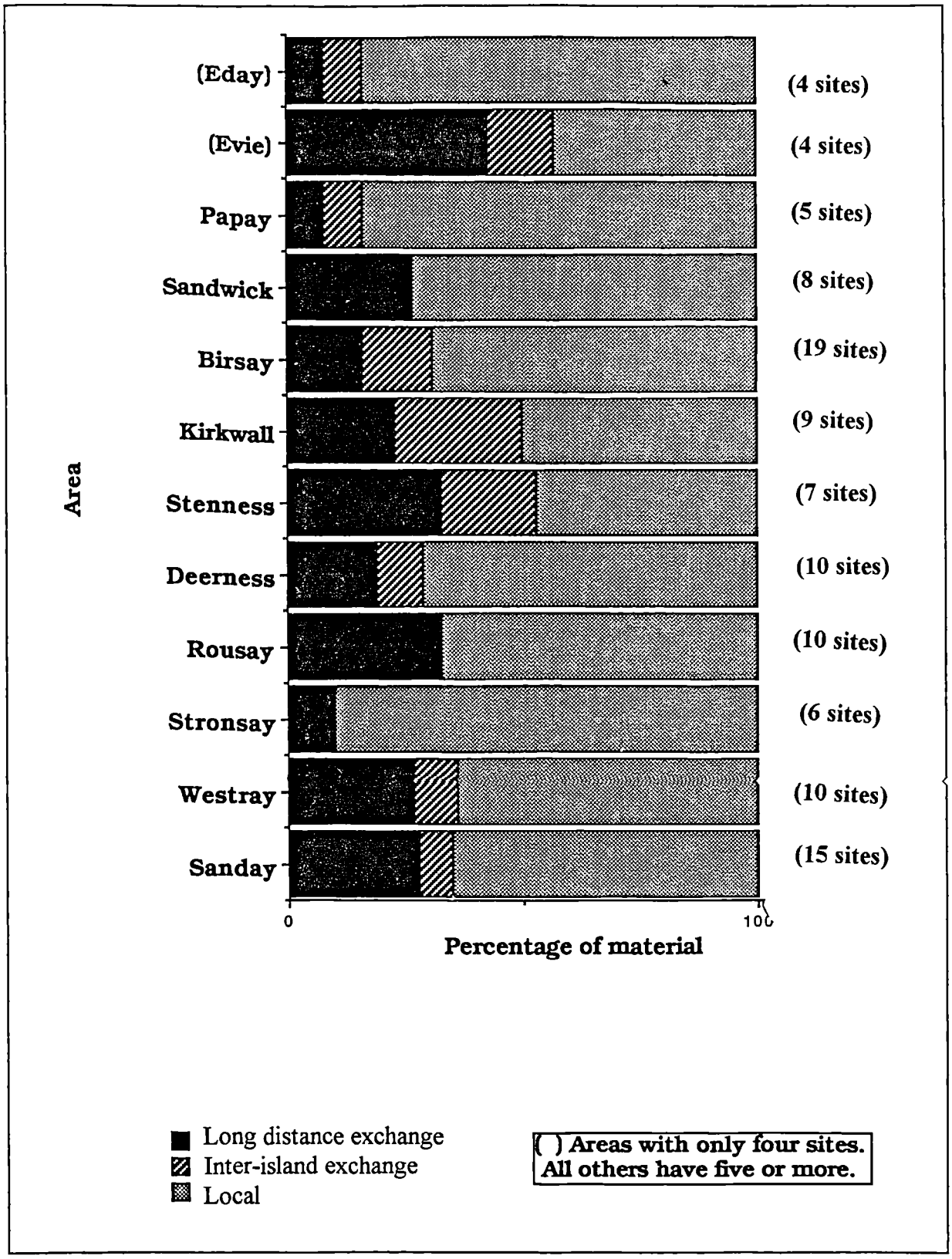


Figure 47 Material classified by mode of transport and area

Trade routes in the North Atlantic can be reconstructed from historical references, the distribution of boat finds and related maritime structures such as harbours, landing places, ballast mounds, boat houses and slipways, and of course, the material evidence of foreign goods. A description of the route from Norway to Shetland and thence to the Faroes, Iceland and Greenland, is given in the *Landnámabók* (Foote & Wilson, 1970, 256). Sailors went along the Norwegian coast to a point just north of Bergen and then set sail westwards, navigating by the stars and sun (using a lodestone), the habits of seabirds and mammals, the currents and by taking depth readings with sounding leads (McGrail, 1987, 276). Under sail an average distance of 72 nautical miles might be covered in 12 hours (Morken, 1980).

Orkney must have been a convenient stopping place for traffic coming from the north, bound for either the west or east coast of Scotland or England and Ireland. The dangerous tidal races of the Pentland Firth in which several ships were lost in the Viking period (Crawford, 1987: 21) could be avoided by using Eynhallow Sound, between the Mainland and Rousay, by using Scapa Flow, or by sailing down the west coast of the island group. Given the nature of medieval shipping, which tended to be coastal hugging with frequent breaks in journeys (Hutchinson, 1994), it is likely that vessels would stop at least once within the group, and yet in a typical map of Viking trade routes (figure 49) Orkney is apparently bypassed altogether.

In addition to these international routes, there was a network of inter-island and inland routes for local travel, in some cases accessible only by small boats with shallow draft (figure 50). Both long distance and local routes might incorporate isthmus portage sites where a boat might be hauled overland. Crawford (1987: 24) quotes the example of the island of Eday, which actually means in Old Norse "isthmus isle". A similar portage site probably operated between Kirkwall and Scapa Flow. The lochs of Stenness and Harray must have formed a major inland route and one might expect to find evidence of a transit point at the Bridge of Waithe where goods were transferred from large boats to logboats, like the one found on Stronsay, or to small plank-built craft (chapter 6).

The hypothetical reconstruction of inter-island routes shown in figure 50) is based on recent local practice, underwater contours, tidal streams and the distribution of medieval settlements with marine-transported goods or maritime structures. A study of the location and density of net fastenings recorded by fishermen, combined with studies of ship losses, followed up by underwater survey will undoubtedly reveal evidence for these routes, through the discovery of jettison sites, anchorages and wrecks.

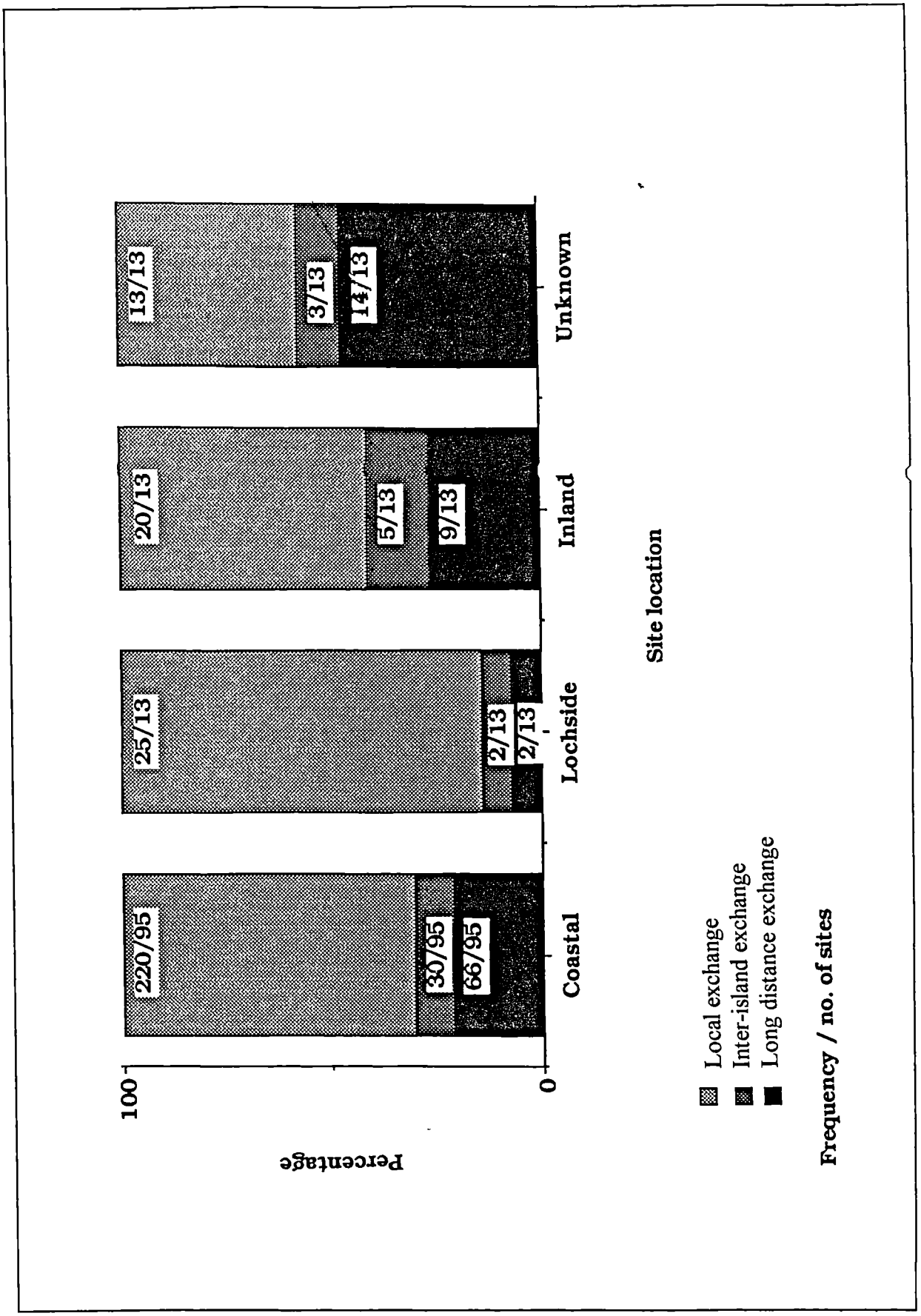


Figure 48 Modes of transport according to site location

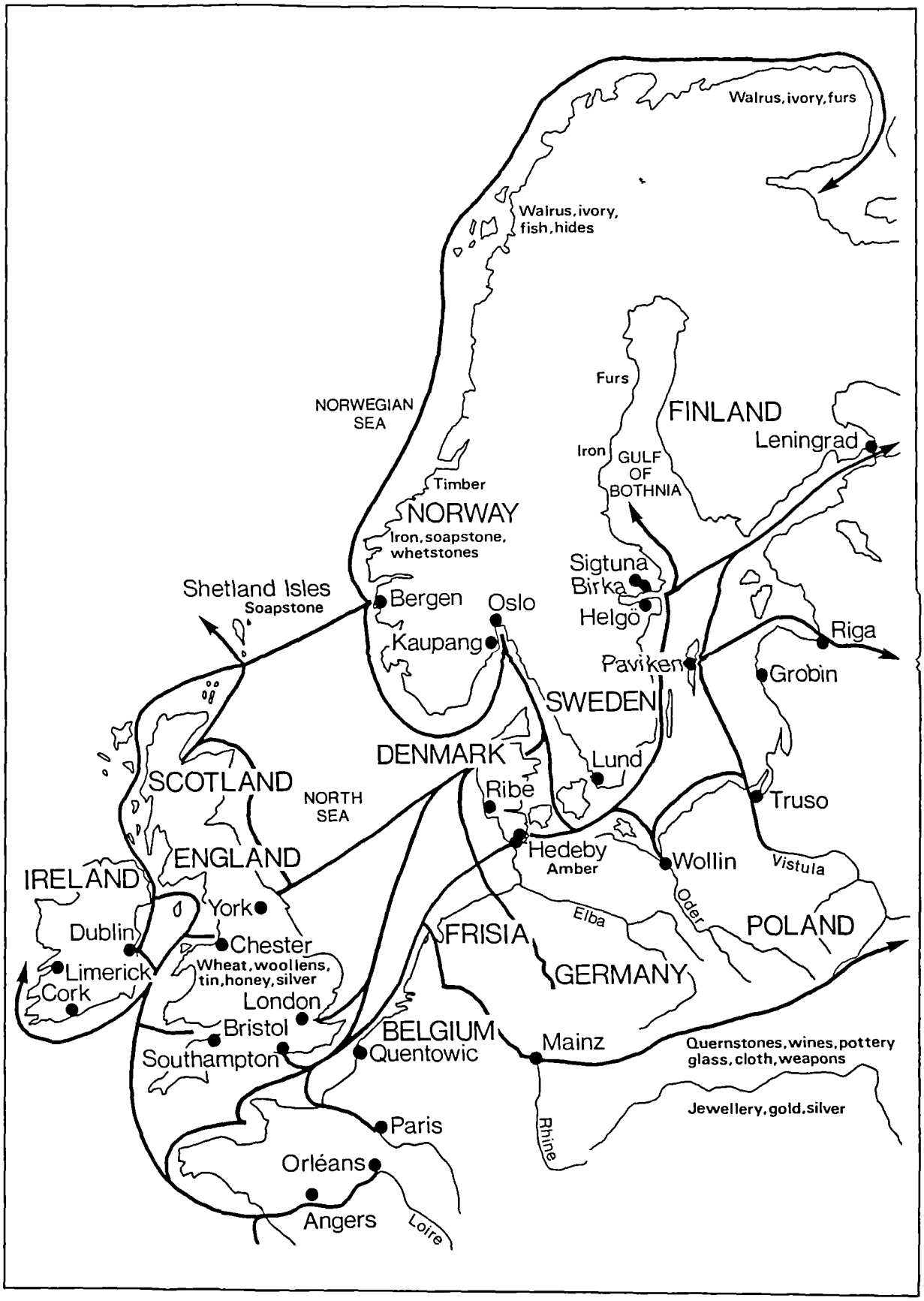


Figure 49 Map of Viking Age trade routes in north-west Europe (after Graham-Campbell 1990)

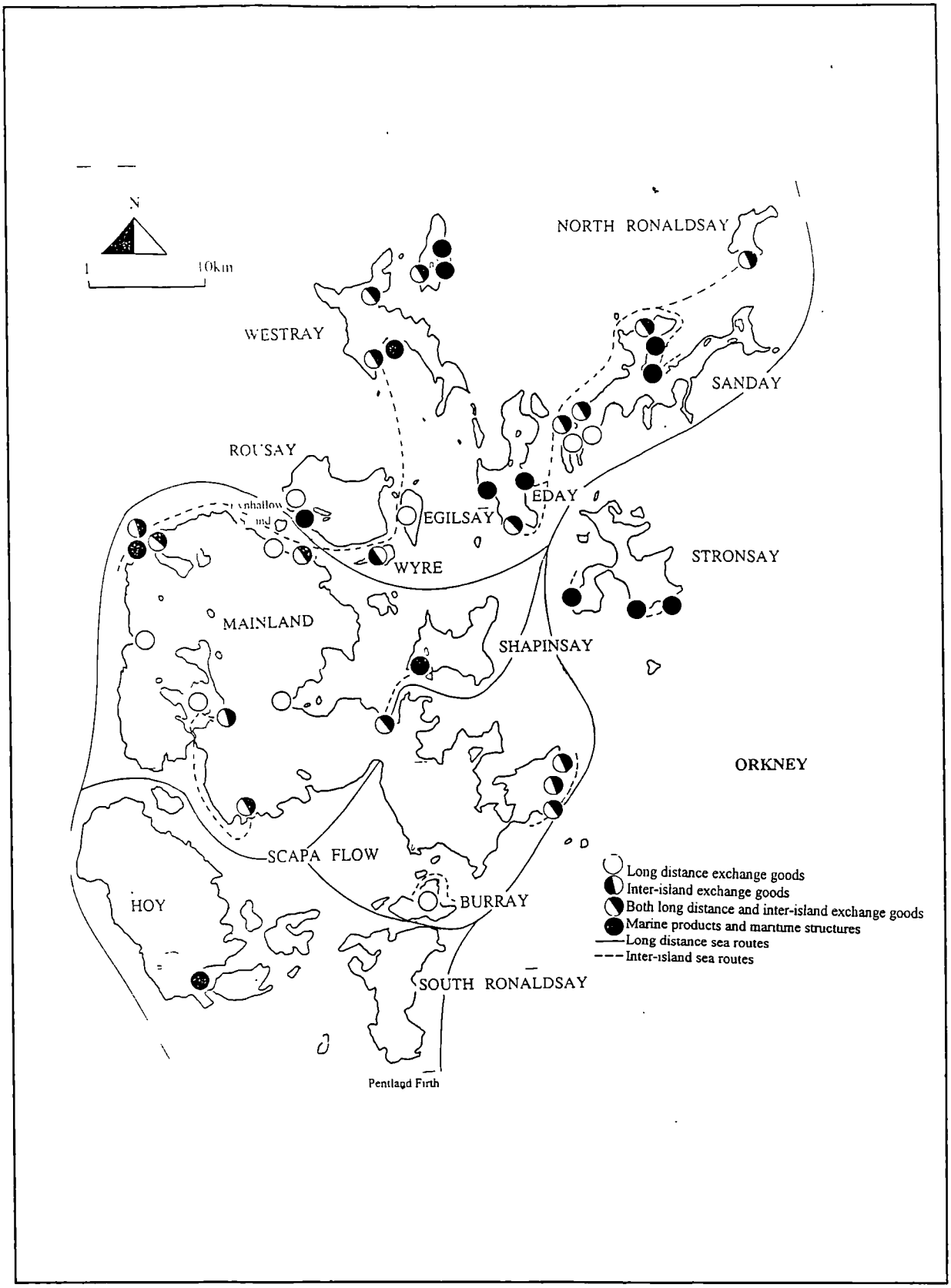


Figure 50 Hypothetical reconstruction of transport routes in medieval Orkney

Summary

On the basis of the foregoing analyses it is obvious that sea transport was important to the economy in the medieval period. If one adds the percentages of foreign goods (23%), objects obtained by inter-island trade (10%) and marine resources (11%) then at least 44% of the material groups found on archaeological sites required sea transport.

Trade and exchange were conducted at formal ports, like Kirkwall, but also at informal beach markets, perhaps with hards upon which the boats would sit, adjacent to settlement sites, as at the early Viking Age site at Ribe in Denmark (Sawyer, 1992). Pool on Sanday and Tuquoy on Westray may have operated as beach markets. Natural havens, such as Pierowall, Westray would also have been exploited. Some transactions may, however, have taken place on board ship, leaving no trace.

Estimating the level of trade and exchange on the basis of the material remains of foreign goods is problematic. The total assemblage of imported goods found in Orkney dating to the Viking and Late Norse periods would occupy a handful of cargo vessels of the type found at Skuldelev. The number of foreign goods is small in comparison to quantities found in the Western Isles, the Isle of Man and Ireland and this supports Ritchie's theory (1993, 33) that the inhabitants of Viking Orkney were by comparison, largely self-sufficient. Another means of guaging the level of trade is to study the boats which carried the cargoes. The remains of just four Viking boats have been found in Orkney. These are discussed in the next chapter.

CHAPTER 6 Viking Boats from Orkney

Introduction

A combination of literary, iconographic and archaeological evidence provides a good indication of the range of boats and ships which were used in Viking and Late Norse Orkney. These included warships, cargo ships, ferries and small fishing boats. The value of studying boats goes further than a simple description of their form and technology. Boats were themselves the objects of trade and gift exchange. The construction methods and materials employed can indicate the origin of the boat and the building tradition to which it belonged. Boat design reflects the function (whether it was intended to carry livestock, or was a ferry or fishing boat) and the environment in which it was to be used (coastal, open seas or inland waterways). The distribution of boat finds identifies areas of maritime activity. Finally, the burial of boats in rich graves, a tradition which was widespread in Scandinavia throughout this period, indicates that the ship was an important symbol in Viking ideology (Crumlin-Pedersen [ed.], forthcoming).

6.1 Boat design and function

There is copious evidence, both direct and indirect, for the use of a range of types of watercraft in Orkney. Several of the Norse sagas refer to the construction and use of ships and boats: the *Orkneyinga Saga* chapters 67, 85, 90 (Pálsson & Edwards, 1978); *Laxdæla Saga* chapters 15, 22, 42 (Magnusson & Pálsson, 1969); and *Njal's Saga* chapters 12 and 83 (Magnusson & Pálsson, 1960). Different names are used according to the type of craft: *bátr* (open rowing boat); *skipsbátr* (ship's boat), *ferja* (ferry); *karfi* (anything from a coracle to a substantial trading vessel); *barki* (small foreign ship's boat); *byrðingr* (transport boat); *skúta* (a coastal rowing and sailing boat), *knörr* (a merchantman and man o' war combined), *snekkja* (a fast lonship), *langskip* (a warship), *skeið* (a warship), *dreki* (a dragon ship, ie. a warship with a dragon's head on the prow), or alternatively the generic term *skip* (simply meaning ship) (Magnusson, 1905). Descriptions of the form of these craft are rare in the literary sources but some, including the dragon ship, are depicted, for example in the graffiti found at Jarlshof, Shetland (Crawford, 1987, 17; figure 51). Furthermore, the exploitation of marine resources (chapter 4), both inshore and in deep water, and the evidence for the transport of materials (chapter 5) provides indirect evidence for the operation of fishing boats.

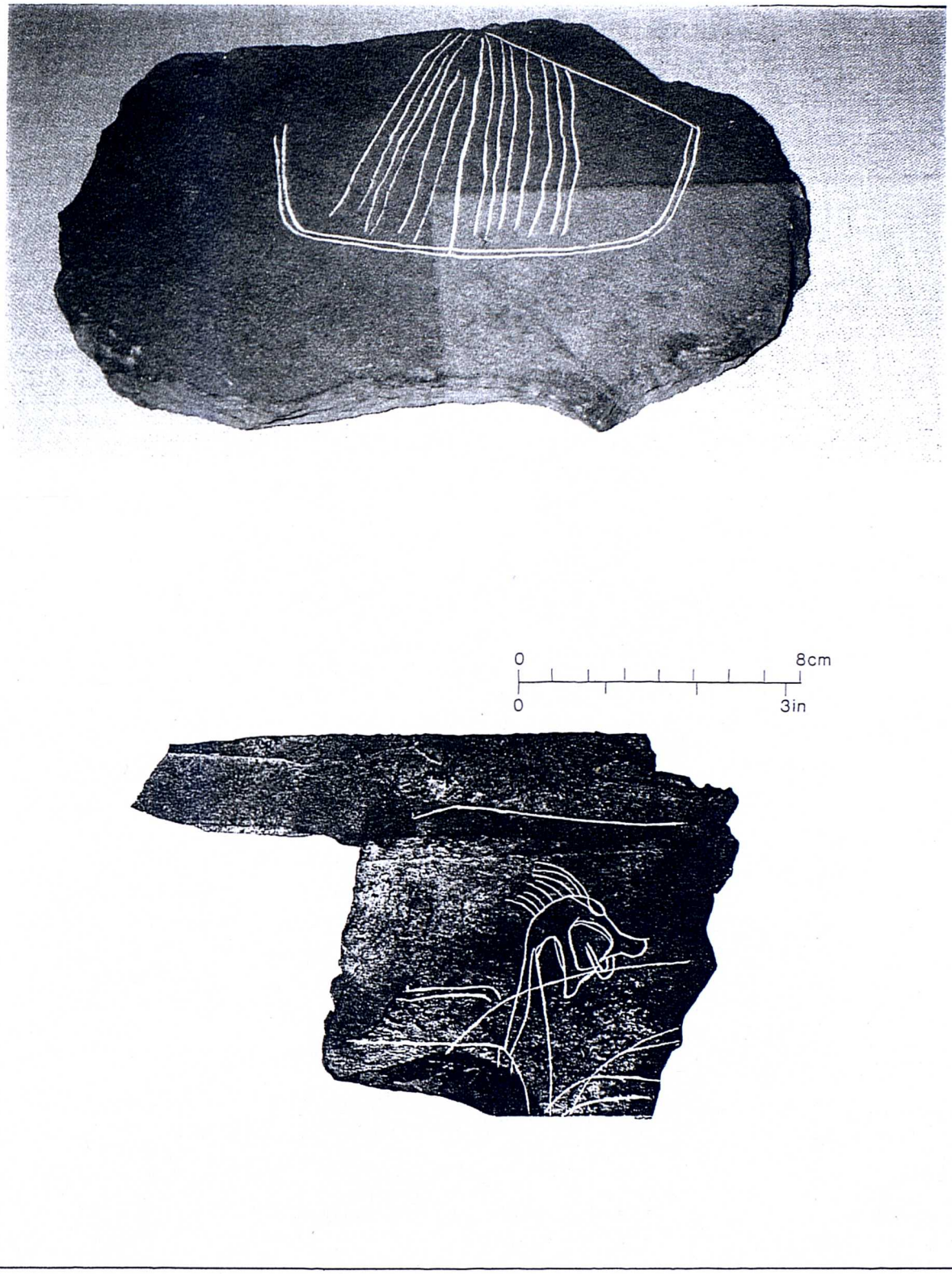


Figure 51 Ship graffiti from Jarlshof, Shetland

Direct archaeological evidence for boats and ships in Orkney is limited. Logboats and also skin boats, remains of which are unlikely to survive, may have been used together with plank-built boats. Only four boats, all *clinker*-built with overlapping *strakes* in the *Nordic* tradition, have been excavated. In each case they survived as boat graves. Two were found in a ninth-century cemetery at Westness, Rousay adjacent to a Viking period settlement (Kaland, 1981; gaz. no. 028). They measured 4.5 and 5.5m long respectively. The larger boat contained the body of a man who was buried with his sword, shield, arrows, an axe and farming tools. It had been constructed of only three or four strakes on each side, with a rowlock and chafing piece made of deer antler. In the smaller boat was buried a man with his sword, spear, axe, arrows, shield, an adze, honestone, strike-a-light and flints. Again the boat comprised three or four oak strakes. A third and larger boat, of which only half remained, was excavated by a team which included the writer in December 1991 at Scar, Burness, Sanday (Dalland, 1992; Allen, forthcoming a). The boat, of which 6.3m of its original c. 7m length survived, was buried in a stone-lined pit, and contained the skeletons of a man, elderly woman and a child. The man was buried with a sword, spear, various tools, a gilded bronze brooch, a decorated bone comb and two lead bullion weights. The woman was accompanied by a bone comb, a sickle (complete with a wooden handle), an iron grilling spit, twenty five gaming pieces, an oval bronze brooch and a carved whalebone plaque. A fourth boat burial was recorded at Pierowall, Westray in the nineteenth century, but all that survives of it are the grave-finds and a handful of rivets. The burial was neither systematically excavated nor recorded. Various conflicting reports have suggested the existence of up to six boat graves at Pierowall, but a re-evaluation of the evidence found evidence of only one (Thorsteinsson, 1968). This was a grave excavated by Farrer in 1863 in the lower part of the Links, just to the north of Pierowall village. There is no account of the size or shape of the boat.

Although there are other burials containing boat rivets, the number of rivets is very small and it is not possible to say with any certainty that these were boat graves. Even the grave at Pierowall with twenty one rivets, might have contained only part of a boat, or re-used boat timbers. There are precedents for this practice in Norway at Kaupang in Vestfold (Blindheim *et al*, 1981).

Crumlin-Pedersen (1992b, 6) has suggested that boats found in graves might be obsolete craft used as coffins, and that the status and symbolism often ascribed them is misjudged. The burial of a boat in Orkney, however, entailed the disposal both of some wealth (in accompanying grave goods) and a valuable resource (wood). For this reason one might anticipate that only an old, redundant boat would have been used. This might also explain why only boats and not ships appear to have been buried, or perhaps ship-burial was reserved for Norwegian royalty? Admittedly only four boat graves is not a very large

sample from which to draw conclusions. The boats found in Orkney were between 4.5 and 7m long and have been dated to the ninth century on the basis of grave goods, a date which would be early in the Viking settlement of Orkney (Crawford, 1987, 37; Morris, 1985, 213).

A fifth boat find from Orkney, though undated, is worth mentioning here. A logboat (gazetteer no. 177) was found by a workman earlier this century at Lea Shun, a loch enclosed by an ayre on Stronsay. It had been patched using nails with a square cross-section. The boat was accidentally destroyed in the 1960s. Logboats were used in the British Isles into the Middle Ages (McGrail, 1987, 85), so the find cannot be dated typologically, though the square-sectioned nails would suggest a medieval or later date. Logboats were commonly used on inland waterways, but the discovery of one in Orkney, where trees of a suitable girth did not grow in medieval times, is unusual. The timber or the boat itself must have been procured from elsewhere.

Over two hundred medieval craft have now been found in Scandinavia and there are also several Viking Age boats from Dublin (McGrail, 1993, 159), the Isle of Man and the Western Isles of Scotland (appendix 5).

Archaeological boat and ship finds from this period can be classified into two groups on the basis of their size: small boats, that is craft of less than six or seven metres in length and medium vessels and ships which are longer and beamier. (This length distinction is derived from a study of a sample of craft from Norway, described below, and a study by McGrail [1993]). It is likely, at least in areas where the necessary raw materials and expertise were available, that small craft were built locally. The place in which a small boat is found is likely therefore to coincide with the area of manufacture. This certainly seems to be the case in Scandinavia (McGrail, 1987). Larger craft, on the other hand, could quite easily travel on open water and might be found a long way from their place of manufacture. It is important to note, however, that small boats might also be transported by ship either, as a cargo or as the ship's boat.

Taking the *Nordic* tradition in Viking Age Scandinavia as an example, there are about six times as many boats as ships known (180 boats as opposed to 30 ships). Despite this, studies of medieval craft have concentrated on the larger craft such as the Oseberg, Gokstad and Skuldelev ships (Crumlin-Pedersen, 1978; McGrail, 1987). Little work has been done on the techniques of construction and the types of craft represented amongst the small boat finds. The reason for this is that most of these survive only as ghost impressions, like the Sutton Hoo ship burial, and generally they have been neither well preserved nor well recorded. Consequently the small boats found inside the Gokstad ship, rare cases where the wood did survive and where it has been possible to reconstruct the craft, are invariably assumed to be typical boats of the period, to which other examples are compared (figure 52).

Studies of variability in the construction and use of small boats remains are rare and our understanding of local building traditions in small boats is therefore poor, despite the fact that the large number of these finds means that many exist for areas where there are no ship finds. Many authoritites in the field of medieval studies seem to be unaware of the large number of small boat finds from Scandinavia.

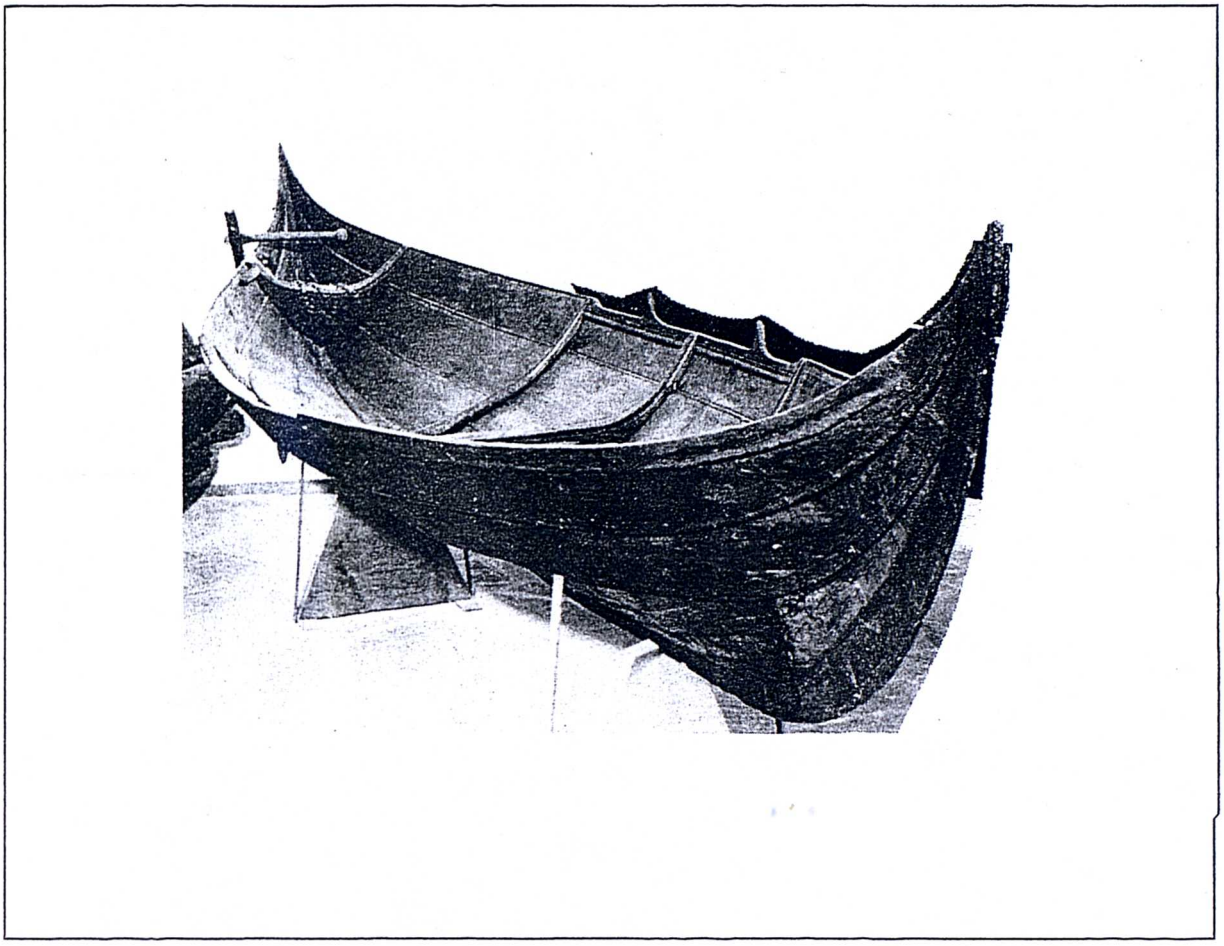


Figure 52 The smallest of three boats found inside the Gokstad ship (Photo: Arne Emil Christensen)

Detailed analysis of the Orkney finds offered the opportunity not only to understand the role and type of boats in the medieval transport network, but also to consider for the first time the issue of small boat building traditions and discover if the boats conformed to a standard type and whether they were imports or the product of a local industry. Drawing conclusions on the basis of only four finds of variable preservation was, not surprisingly, problematic, and for that reason analysis of the Orkney finds was contextualised by an analysis of a larger sample of similar craft in medieval Norway and of recent vernacular building traditions in Orkney.

6.2 Boats in ninth century Norway

I have selected two study areas in Norway (figure 53) on the basis of their geographical location, distinct recent vernacular traditions of boat building and the number of ninth century boat finds to test the hypothesis that local traditions in the construction of small boats existed within the broadly *Nordic* tradition of the ninth century. The choice was also influenced by the need for the areas to be easily accessible with central museums housing the finds and site records. Östfold and Vestfold around Oslo in the south were obvious candidates since the best preserved boats from the Gokstad ship burial are here. Nord and Sör Tröndelag, around Trondheim was selected as the other area. In April 1992 I spent a month in Norway, in Bergen, Oslo and Trondheim, researching boat finds. Museum catalogues, databases and stores were the source of most of the information, much of it unpublished archival material. The origin of the Viking settlers in Orkney is argued on the basis of language and archaeological evidence to be south western Norway. Boat finds from this area were not studied since they were fewer in number than those from the two study areas and distinct local traditions would be less obvious because of the proximity of the study areas.

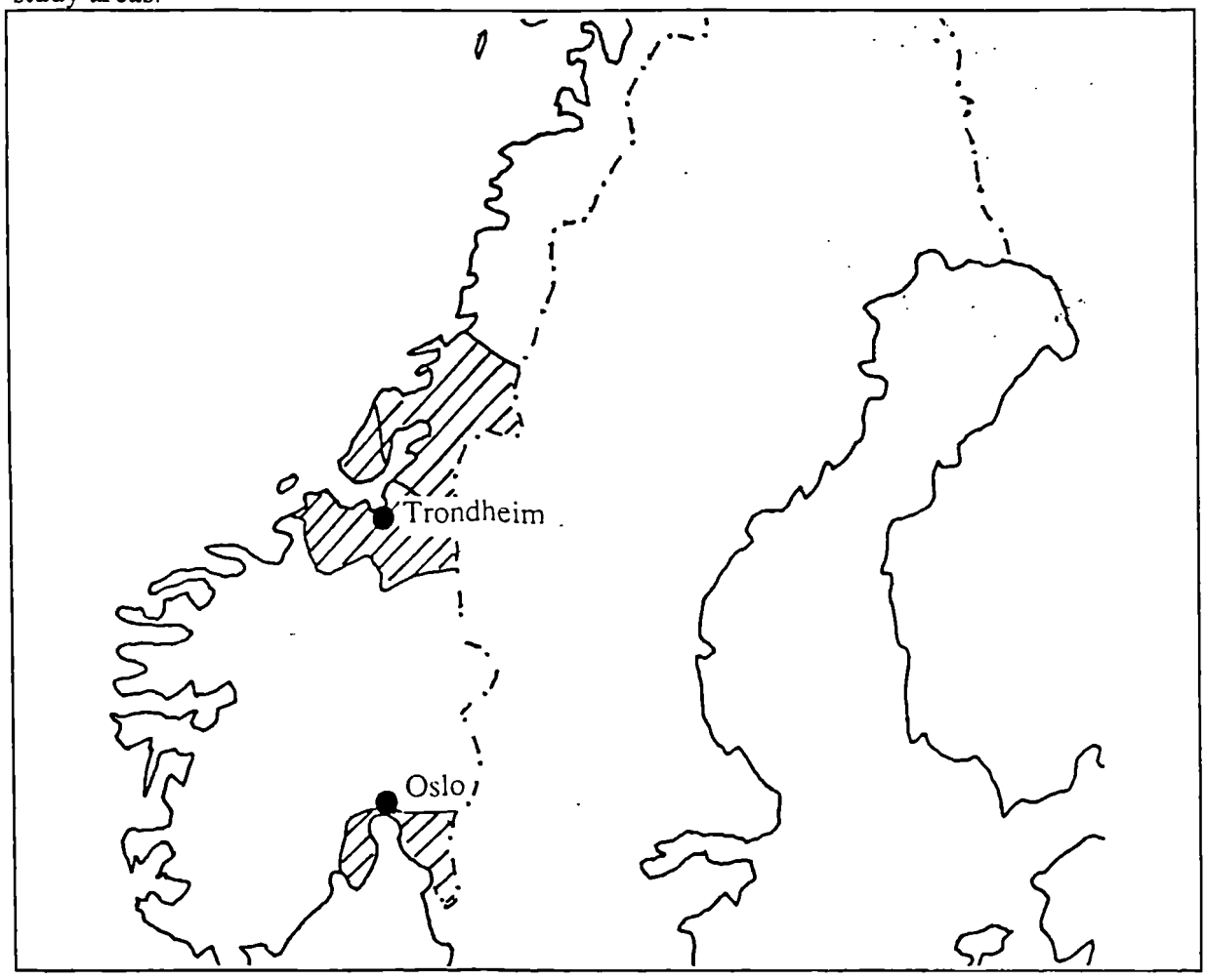


Figure 53 Study areas in Norway

Smith (1927) saw the earliest development of local boat building traditions in Norway as beginning at the end of the seventeenth century as a result of the industrialisation of fishing. In his opinion it was only then that different districts developed characteristic boat types: the eastern, northern and western boat forms. The eastern boat types (jekts, whale-boats and prams) had mainly sailing characteristics, were strongly-built from small narrow planks fastened by trenails and linked by many string frames. They were broad and deep forward and had a rounded form for setting upright again when heeling, and were rigged with a square sail and spritsail similar to boats in the neighbouring Baltic area and the North Sea. The northern and western boat types (such as Hardanger, Sunnfjord, Nordfjord, Sunnmör, Nordmör, Åfjord and Nordland boats) were, by contrast, rowing boats, although furnished also with mast and sail. That is to say they were long and narrow, built from broad fir planks, fastened by iron nails and linked by only a few frames. The following analysis of boat finds in Norway shows that different boat types were used within and between the two study areas as early as the ninth century.

Initially, it was important to ascertain whether small boats could be distinguished as a distinct group in the grave assemblages. Forty three craft were examined from Östfold and Vestfold and forty eight from Nord and Sör Tröndelag. The lengths of the boats were plotted (figure 54). In Östfold and Vestfold this showed a clear distinction between ships, which were fifteen metres or more in length, and boats which were less than eleven metres. The majority of finds were between five and six metres, although there was a tendency for boats from Nord and Sör Tröndelag to be longer overall. The difference between large boats and small ships was less distinct in Nord and Sör Tröndelag. This correlates with the greater beam found in craft in this area. Clearly a ship cannot be defined on the basis of length alone, but it is usually accepted as the prime indicator (McGrail, 1993, 95) for craft at this time. McKee's definition (1983, 15) that a ship is a vessel which was designed to stay at sea self-supported for a period of time is also relevant here and although small boats could have withstood voyages at sea this was not the purpose for which they were designed, being rather ferry and fishing boats used for internal and short coastal journeys, or as ships' boats. Since only small boats were under scrutiny only those craft of eleven metres or less in length were studied further.

All of the boats were from boat graves of variable preservation where wood rarely survived. Given the quality of the evidence the most frequently recorded characteristics that could be used to determine boat type were: the overall dimensions, length, breadth and depth and the ratios between these; the presence or absence of a keel; the number of strakes and their breadth; the system of framing; the nature of the fastenings and the building materials used.

6.2.1 Shape of the boats

The range of shapes which a hull can take is determined by the technology, tools and materials available, as well as an individual builder's preferences. Hull shape is the major factor affecting a boat's performance and there are set conventions for describing it. McKee (1983, 79) ascribed actual values to these. Overall dimensions, length [L], maximum beam [B] and depth amidships [D], for example, are a good guide to the shape and relative cargo space of a craft. These are best compared as ratios, that is L:B and B:D. McKee states that a boat is *beamy* if L:B </= 2.6 and *narrrow* if it is >/= 3.75; it is *deep* if the B:D is </= 2 and *shallow* if >/= 3. Ratios inside these values are *normal.*

Plotting L:B for the boats from the two study areas (figure 55) shows that the largest proportion of boats fit into the *narrow* category. Such *narrow* boats are better suited to rowing and work in coastal waters. *Beamy* boats tend to be sailed, or work in deep water. *Shallow* boats are better for coastal work, fjords, inland waterways and environments where they might be beached, whereas *deep* boats have greater cargo capacity and have a better grip on the water for sailing. They are not suitable for work in shallow water, but are better in tidal waterways. The results fit well with the geography of the two regions.

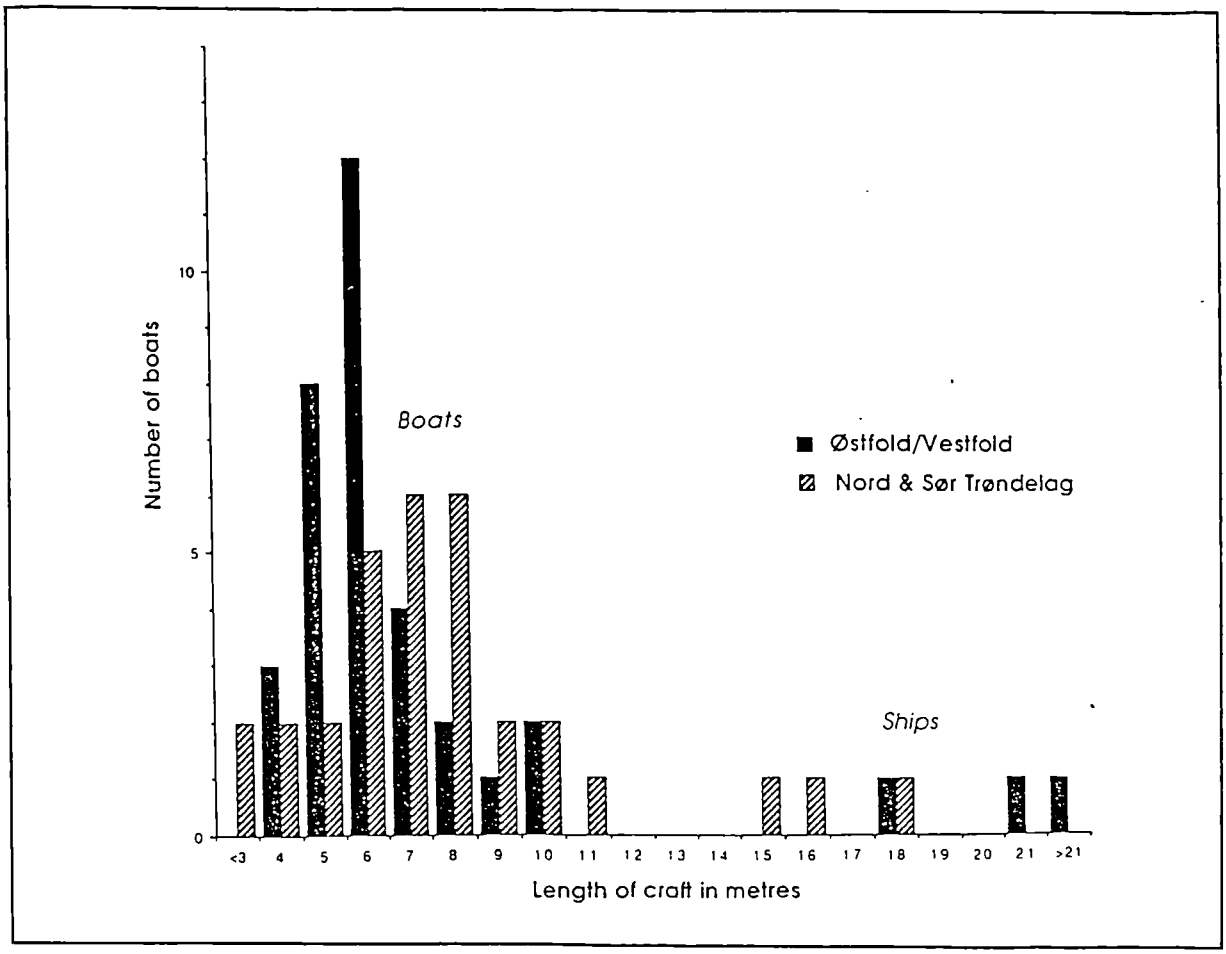


Figure 54 Length of ninth century craft in Norway

The B:D plot (figure 56) shows that boats from Östfold and Vestfold are proportionately deeper than those from the western group and the distributions are split into different groups, suggesting that more than one form of craft was used in each area.

The majority of the boats had the classic narrow L:B of the *Nordic* tradition, but those from the south were deeper and shorter than those from western Norway. Both areas, however, had more than one type of boat. Not all of the craft were, however, built in the *Nordic* tradition, four examples were probably *prams*, built without keels.

Narrower strakes were used in Nord and Sör Tröndelag than around Oslo and the materials also differed, with oak being preferred to pine in the south. There were insufficient grounds to argue a significant distinction between the two areas on the basis of the framing techniques employed, but there were some differences in the range of fastenings used. The Östfold and Vestfold region was distinct in having evidence for the use of trenails to fasten the ribs to strakes, whereas in several cases in western Norway J-shaped and anchor-shaped nails were used for this purpose. Iron clinker rivets, one of the characteristics of the *Nordic* tradition, were common to both areas. Analysis of the boat building materials employed in the two study areas might determine the provenance of boat types, modes of production and the procurement of materials. Wood remains were invariably incorporated into the corrosion products of the iron rivets, but in virtually all cases this had not been analysed. Unfortunately such work was beyond the limits of this study.

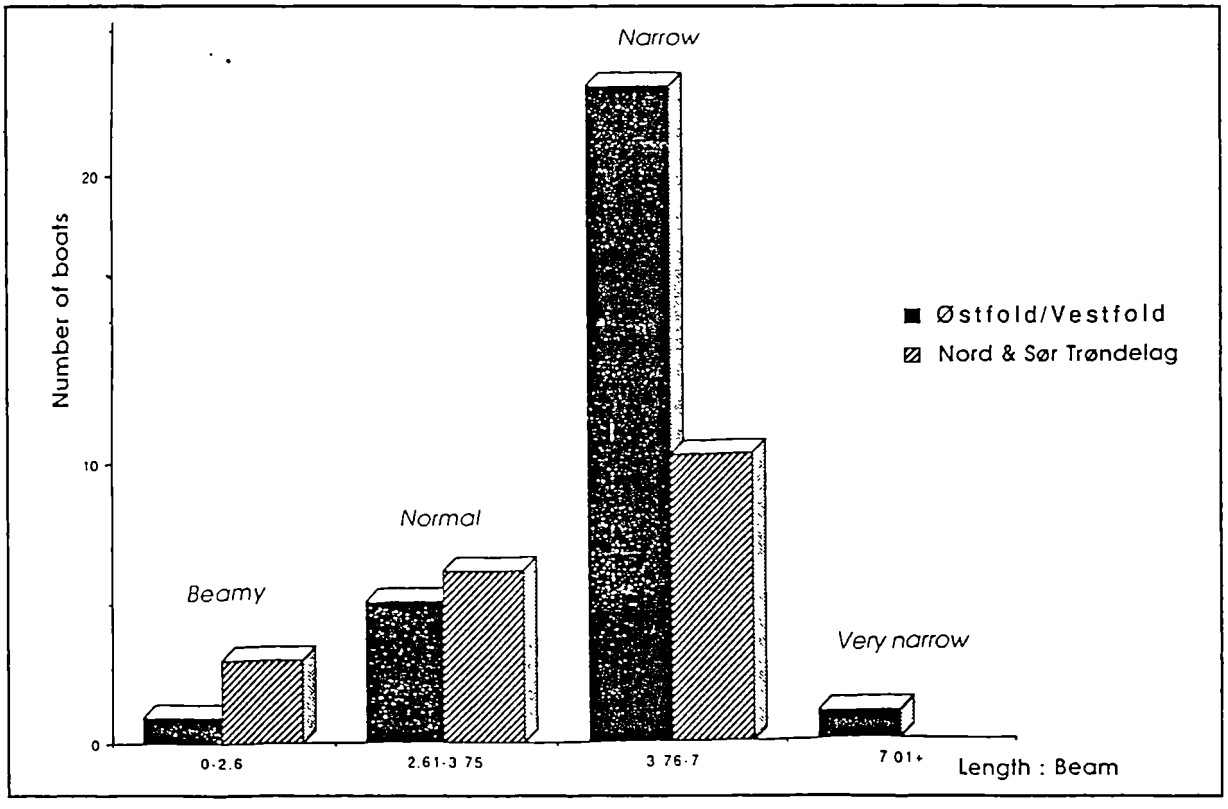


Figure 55 Length to beam ratios of ninth century boats in Norway

Ulriksen & Tommerstigen (1990) has argued for the use of basic rules of measurement in the construction of the boats at Gokstad and at Tönsberg. She calculated an *ell* or *alen* of 0.55m from the keel lengths and radii of imaginary circles into which the stems would fit. If correct, this identification would support the idea of a local school of building in Vestfold, and perhaps even an individual craftsperson or workshop. It would be interesting to extend this hypothesis to boats elsewhere in Norway, but this would require good preservation and recording.

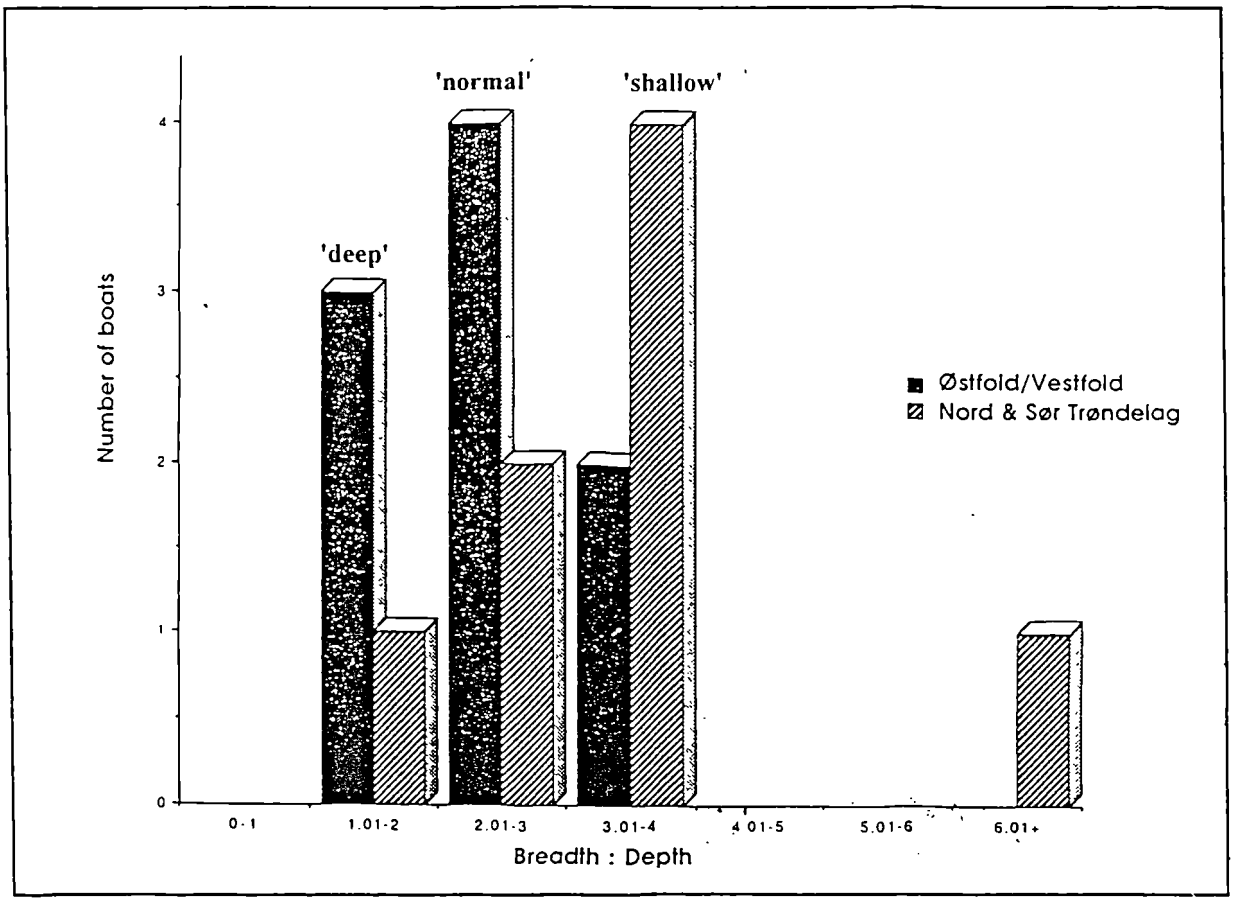


Figure 56 Beam to depth ratios of ninth century boats in Norway

The survey shows that there is sufficient evidence to conclude that the boats from the two study areas were quite different, though they may represent two ends of a continuum. The boats in the south were, in general, deeper and shorter than those from western Norway. The southern boats were built from fewer and broader planks, in a wider variety of materials using trenails as well as iron rivets. J-shaped nails were used in Nord and Sör Tröndelag. These distinctions are, in part, a reflection of the different materials locally available. Specific construction details such as the choice of fastening type may have been functional, or ideological, or simply the preference of an individual builder, but if this were

the case, one might expect greater variation than is apparent in the assemblages. Bill (1994, 54) is of the opinion that the round-shanked nail used in both study areas in the Viking period are apparently the products of smaller scale enterprises than are the uniform, mass-produced, square-shanked nails used in the Middle Ages in Scandinavia.

In light of the study of small boats in ninth-century Norway it was evident that the finds from Orkney should not necessarily be considered as a unified group simply because they were found in the same area and that it would be possible to compare the form of the Orkney boats with those from Norway, the homeland of the Viking settlers.

6.3 Two Viking boats from Westness, Rousay

The site of Westness (gaz. no. 027) lies on the south west of Rousay, looking out across Eynhallow Sound to the Mainland and with direct access to the Atlantic in the west. It is mentioned in the *Orkneyinga Saga* (Palsson & Edwards, 1978, 101). Artefacts have been found in the area since 1826 (Orkney SMR). In 1963 a woman's grave (gaz. no. 031), dating to the Viking period, was discovered. Excavations were subsequently carried out there in 1968-70; 1967; 1972 and 1978-80 (Kaland, 1973; 1981; 1993; gaz. nos. 028; 029).

The site was found to comprise a farm complex, a cemetery and a boat noust (figure 57). The farm consisted of a longhouse and two smaller houses which were probably animal byres. There may also have been a smithy to the west of the longhouse. Two hundred and fifty metres to the east of the farm was found a rectangular boat noust, and fifty metres to the north of this on the highest point of the Ness, a graveyard. The use of this cemetery, in which were found the remains of men, women and children, is dated by grave goods and radiocarbon dates to the ninth century.

The excavation of five graves from the early seasons of excavation was reported upon by Kaland (1973). Two of the five were rich female burials, one of which also contained the body of a child. Two were rich male graves, and the fifth, near the noust, did not contain anything other than a few rivets, possibly from a coffin. A further thirty two graves were excavated between 1978 and 1980, including two boat graves (Kaland, 1981). No further details were provided and publication of the results is still pending.

6.3.1 Westness 1

The first boat was discovered in 1979 and was completely excavated in 1980. The second boat was uncovered in 1980. The method of deposition of the first boat was as follows. A hole of about the same size as the boat had first been dug and the boat placed into it. Its position had then been stabilized by placing stones and lumps of clay along the keel, and by putting small flat stones between the gunwale and the pit. A chamber had been created amidships by filling the fore and aft of the craft with stones (figure 58).

The excavation of the two boats has not been published in any detail. Fortunately the National Maritime Museum assisted in the excavation of the first boat and it has been possible to obtain some of the survey information from them. Figure 59 shows a plot of the location of rivets which were found in the first boat. The figure was generated from a photograph and site plan using the computer package *Aerial*, designed to rectify oblique aerial photographs.

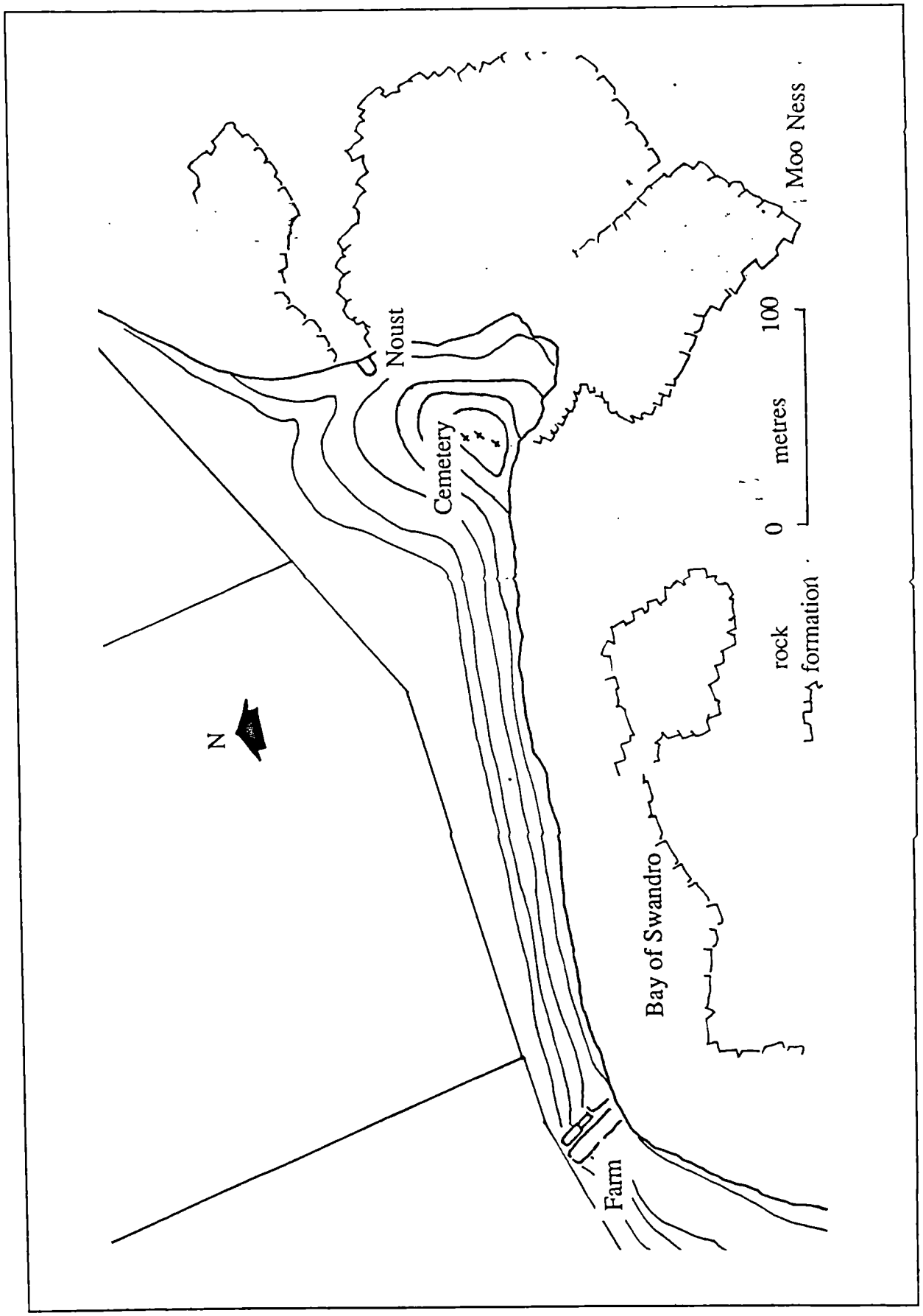


Figure 57 The settlement complex at Westness, Rousay (after Kaland, 1973)

Figure 58 Westness 1 - The burial chamber (Photo: Sigrid Kaland; after Hall, 1990)

The two-dimensional plot shows that the boat was built on a keel in the shell and clinker technique, with the overlapping strakes fastened by iron rivets. There appears to be four strakes on each side of the boat which is about 5.25m long, 1.35m in beam with a depth amidships of around 0.6m. These figures would give it a L :B ratio of 3.89 (*narrow*), a L:D of 8.75 and a B:D of 2.25 which lies within the *normal* range. Viking period boats in Norway are usually *narrow* and *shallow* (though variablity is possible - see section 6.2). Westness 1 therefore seems to be somewhat beamier and deeper than one might expect of a Viking boat. External details of the boat were lacking since no information has been published on sections which were cut through the keel of the boat to obtain the keel profile. I am not sure if sections were ever put through the stem to obtain similar information.

No floor timbers or other internal framework, with the exception of a possible stringer, could be distinguished. Analysis of the types of fastening in relation to their positions in the boat would elucidate this problem. Unfortunately access to this information was not permitted. The frames may have been destroyed or moved when the ends of the boat were filled with stone. The position of the ribs might, alternatively, have determined the extent of the stone infill, since they would have provided a convenient edge at which to create the chamber. It is likely, therefore that there were frames fore and aft of amidships, another about amidships, with reinforcement at the stems being provided by dwarf bulkheads, as found in the Gokstad færing (Christensen, 1959).

The strakes were apparently of oak, to judge from the wood remains preserved in the corrosion products on the iron rivets. An antler rowlock (figure 60) was found, and so this was evidently a rowing boat. Another antler object, described as a chafing piece was also found (figure 60). The piece showed signs of wear, as if a line had rubbed against it. It was probably used to prevent wearing of the topstrake from fishing line. This boat was evidently a rowing boat used for fishing. Chafing pieces were also found at the Iron Age broch at Burgar, Evie, Mainland Orkney and at Jarlshof, Shetland (figure 61). The location of the rowlock and chafing piece on the boat is not published.

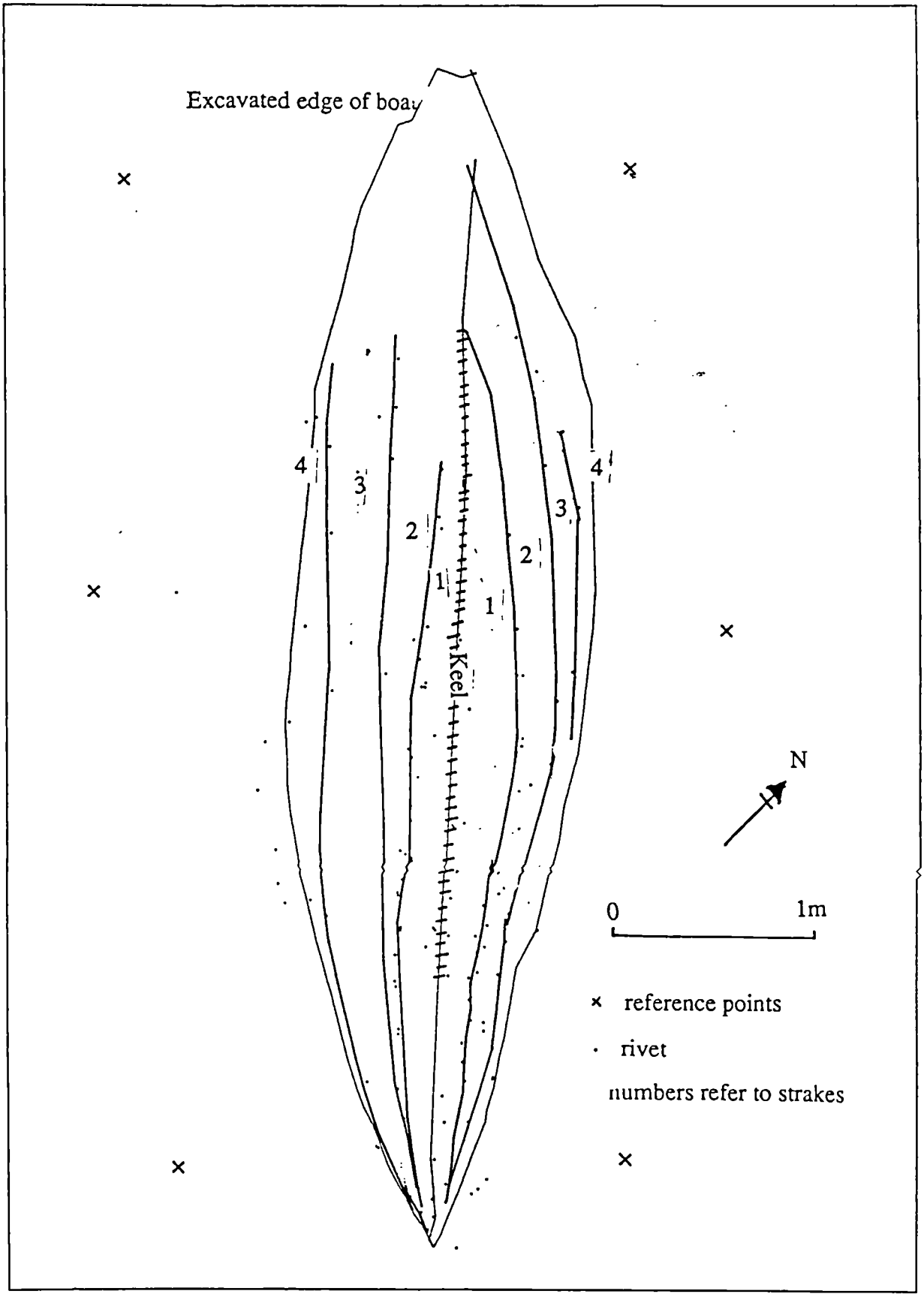


Figure 59 Westness 1 - plan view

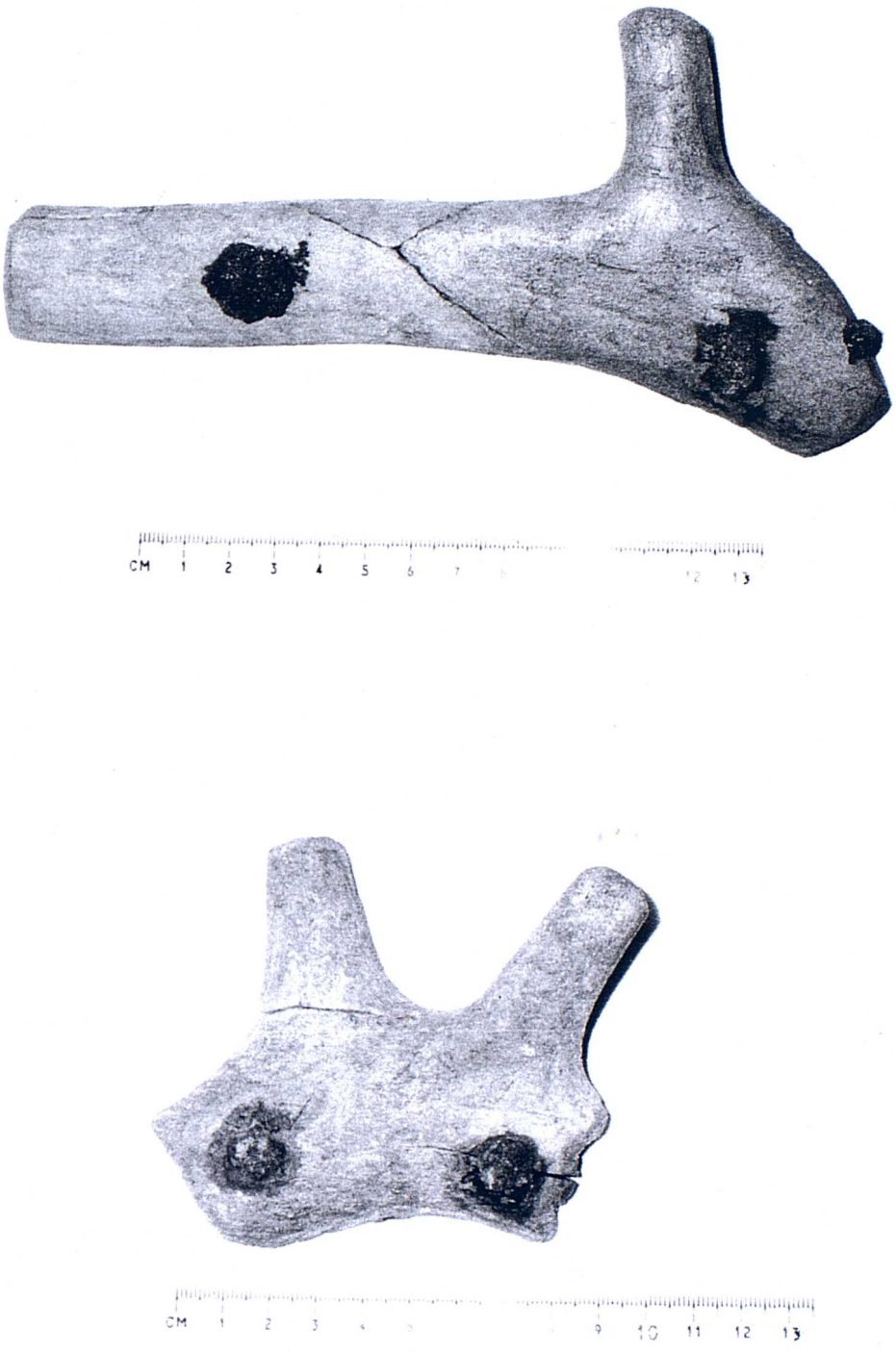


Figure 60 Westness 1 - antler rowlock and chafing piece

6.3.1 Westness 2

Like the first boat, Westness 2 was found in a partially stone-lined pit and had a chamber amidships, created in the same way (figure 62). The only published details describe it as being about 4.5m long, of three or four strakes each side, fastened by iron rivets. Similar internal fittings to those of the larger boat might be conjectured. Although the excavator has restricted access to further information, a cast was taken of the boat in the field (now housed by the National Museums of Scotland) and it was possible to derive more details from this.

A tentative reconstruction based on measurements taken from the cast of the boat gave it a reconstructed maximum length of 5.5m, a beam of 1.4m and a minimum depth of 0.45m, giving a L:B of 3.93 (*narrow*), L:D of 12.2 and B:D (only just *shallow*) of 3.1. The boat had quite a a full stem and stern compared to the Gokstad færing. The keel was at least 3m long and had a maximum width of 0.14m. The strakes averaged about 0.30m wide. On the basis of shape alone Westness 2 cannot be seen as belonging to a known boat building tradition. The use of broad oak strakes is similar to boats in southern Norway.

6.3.3 Assessment of performance

A boat's performance is a result of hull design, the method of propulsion used and the user's abilities. The size of the boat and its hull shape determine its buoyancy, stability, speed, maneouvrability and cargo carrying capacity. Simple coefficients based on the boat's overall dimensions can be used to estimate its capabilities. The following calculations for Westness 1 and 2 are based on McGrail's methodology (1987, 192).

The ratios of length to draft (L:T) and beam to draft (B:T) give an impression of the stability of a boat. The draft was calculated here using a Medieval Icelandic Law which states that the minumum freeboard of a cargo ship should be 2D/5, where D = depth amidships (Morken, 1980:178). This would give a minimum freeboard of 24cm in Westness 1 and 18cm in Westness 2. In reality an operational freeboard as small as 15cm might have been used. The draft is then the depth less the freeboard. L:T ratios of 14.6, 20.4 and L:B ratios of 3.75 and 5.2 for Westness 1 and 2 respectively indicate that the boats were manoeuvrable but not good for carrying bulky, low density goods. They were both rowing, rather than sailing craft since the light draft would offer little resistance to leeway.

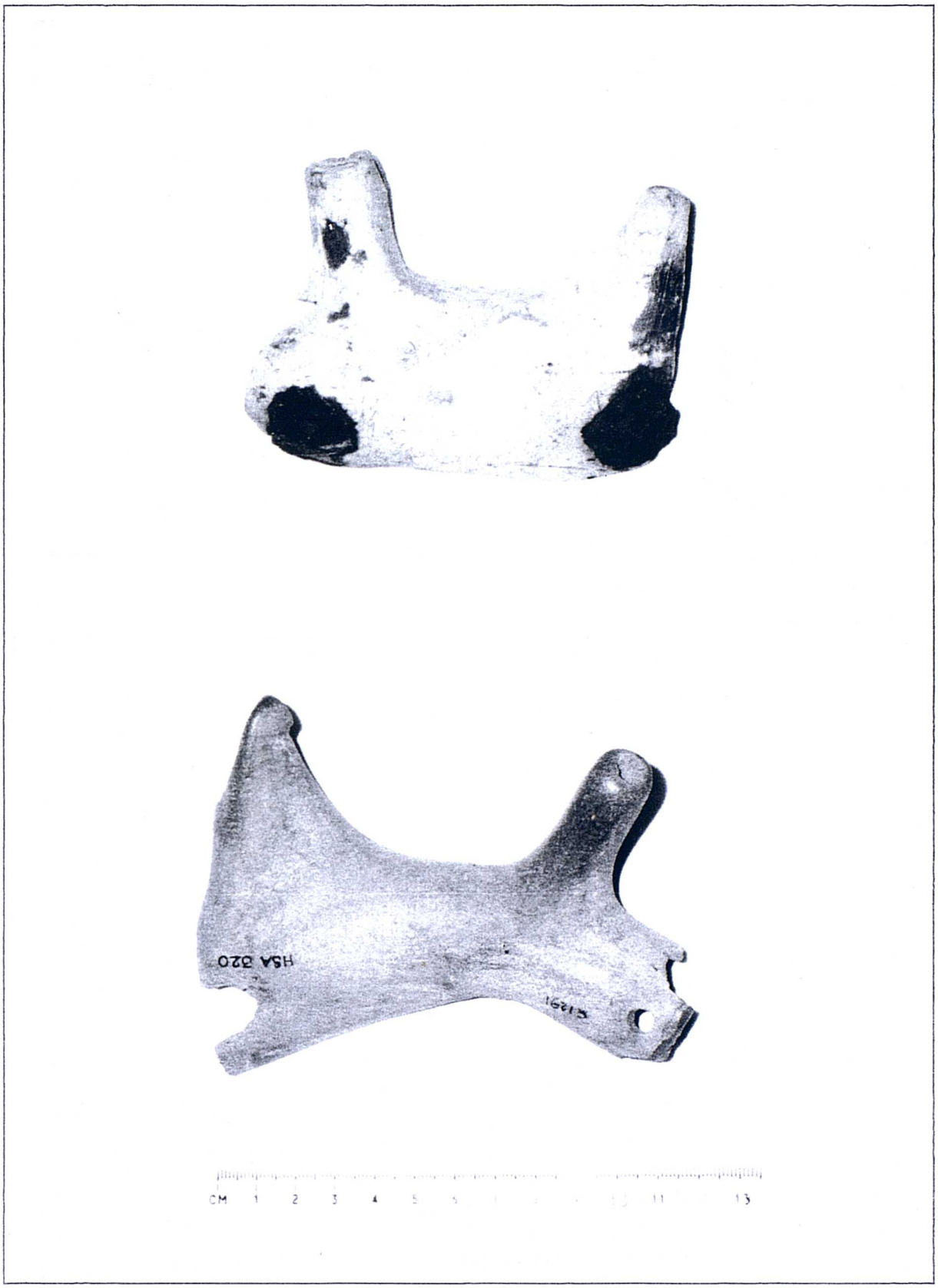


Figure 61 Antler chafing pieces from Burgar, Evie and Jarlshof, Shetland

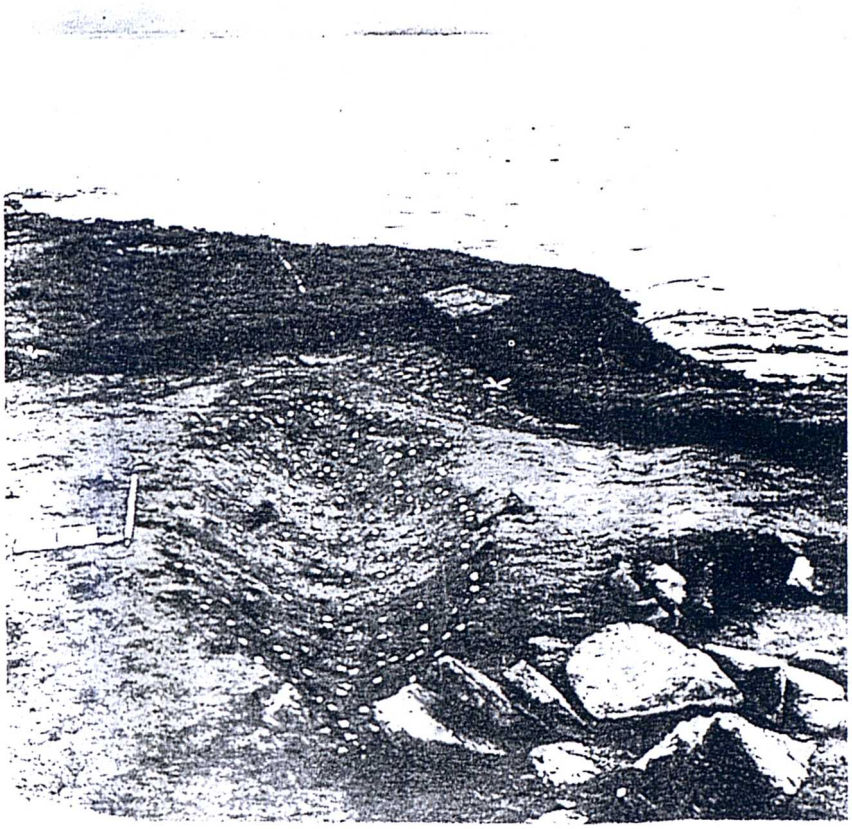


Figure 62 Westness 2 during excavation (Photo Sigrid Kaland)

The space available for storing cargo was minimal. This capacity might have been increased by reducing the crew, perhaps to a single person. Calculations on the replica of the Gokstad *færing*, which was about a metre longer than the two Westness boats, but with the same crew, allowed an optimum cargo weight of 411 lbs (186 kg) though this figure will vary according to the volume to density ratio of the cargo (McGrail & McKee, 1974). This was calculated using heavy metal chain as "cargo" on the bottom boards amidships. If the commodity to be carried was stone (estimated density 2500 kg/m^3) the optimum weight of cargo would fill only 0.07m^3. For grain (density 680 kg/m^3) this would be 0.27m^3 and for turf (density 480 kg/m^3) 0.39m^3, allowing for two crew. Both boats from Westness would have a similar capacity, though being deeper Westness 1 was slightly better designed to

handle cargo. In reality, the effect of the cargo and its position in the boat on the boat's buoyancy would also need to be calculated. This requires an estimate of the displacement volume of the boat and its weight. It is difficult to reconstruct these without a line drawing and strake diagram. Unfortunately insufficient evidence survived from either boat to produce these.

The slenderness coefficient (ratio of length to beam: 3.9 and 3.93 respectively) indicates that both boats were reasonably fast, though not as quick as the Scar boat. A theoretical speed of between 2 and 5 knots could have been achieved depending on the environmental conditions (based on McGrail, 1987, table 11.1).

Given the characteristics of the boats as slender, shallow rowing boats, unsuitable for carrying bulky or particularly heavy cargoes, together with the presence of chafing piece on one of them the boats were probably fishing boats, used also in inter-island communication.

6.4 A Viking boat from Scar, Sanday

In December 1991 a rescue excavation was mounted on the northern Orkney island of Sanday to uncover what was thought to be a Viking boat burial (gaz. no. 045). A burial mound had been noted at the site in a previous archaeological survey (Lamb, 1980), but the grave was only found following reports of a skeleton eroding out of the shore. Excavation showed that the mound was, in fact, unrelated to the boat burial which was a flat grave. The mound along with other visible features were the subject of geophysical survey, the latter may yet prove to be part of some associated settlement.

Scar is the fourth Viking period boat burial to be excavated in Orkney. Virtually all of the wood had decomposed and the boat survived only as an impression in the ground (figure 63). The form of the boat was preserved in the pattern of iron nails and rivets which once fastened the planks together. Wooden planking and caulking material were found mineralised on the fastenings and it has proved possible to provenance sand grains trapped inside the caulking during construction. The site is the first boat burial from Orkney to be both scientifically recorded and rigorously analysed and is therefore of the utmost importance in considering the types of boats used and their function. The discovery of the boat offered a rare opportunity to study in detail the quantity and range of information which it is possible to derive from a 'ghost' burial. The results are therefore considered here in detail.

6.4.1 Excavation and recording

Before the excavation began it was evident that a substantial part of the boat had already been lost to the sea. This made it possible to excavate the boat from the north side without requiring planks to be set up across the site. The excavators approached the boat from above rather than digging in from the section in the hope of retaining the boat shape. Apart from the area of an otter's nest, the surviving portion of the boat remained intact.

Each fastening was located three dimensionally using an electronic distance measurer and theodolite and was given a unique number. In some cases the alignment of the nails and rivets was also recorded. Lack of time prevented detailed plans and profiles of the boat being made in the field. In retrospect these would have been useful in determining which fastenings remained *in situ*, and as an initial interpretation of the boat structure. No sections were cut through the boat to determine the external form of the keel and stems, hence their reconstruction in this report is conjectural. At the east end of the boat part of the keel survived as a mass of organic material. This was sampled as a block and is now frozen. The possibility of taking a cast of the boat was considered but proved both impractical and too expensive.

Figure 63 Boat burial at Scar, Burness, Sanday - the boat's hull
(Photo: Magnar Dalland)

6.4.2 Conservation

All of the boat fastenings were X-rayed and mechanically cleaned with hand tools under 10x microscopy. Measurements were taken of the head, plate and shank from both the object and the X-ray. The presence of organic remains, the grain direction of wood, the thickness of surviving planks and the presence and types of joint were noted where visible. The conservation report also detailed the orientation of the head, plate and shank to each other, and any additional metalwork found in association with the fastenings (Watson, 1993). Mineralised wood remains attached to rivets and artefacts were analysed to determine species (McCullagh, 1993).

Thin-sections were prepared from samples taken from the bottom of the boat. Analysis revealed caulking material sandwiched between the strakes and foreign minerals in sand grains lodged within the caulking (Carter, 1993). Petrological analysis of these sand grains suggested their origin (Dixon, 1993).

6.4.3 Boat construction

Over 300 iron fastenings were found, demonstrating that the craft was clinker built with overlapping planks in the *Nordic* fashion ubiquitous in Northern Europe in the Viking period (figure 63). Figure 64 is a plan of the boat fastenings annotated to show the position of the keel, the strakes and the various types of fastening. The orientation of the fastenings was not recorded in all cases and it is not always possible therefore to determine which rivets were displaced and which remained *in situ*. It is clear from the figure that a significant portion of the western end of the boat and virtually all of the north side had been lost. In the ground the boat measured 6.3m long, had a beam of 1.6m and was 0.6m deep. There were evidently six strakes on each side of the boat.

The fastenings

In studying a "ghost" boat careful recording of the fastenings is vital to understanding the original form. The detailed analysis of boat nails and rivets is a relatively new subject. Bill (1994; figure 65) studied about 150 finds from Northern and Eastern Europe and established a typology of boat fastenings based on the shape of their head, the shank cross-section and the rove or nail ending. Of the 310 fastenings recovered from the Scar boat (table 21) almost 46% were rivets and just over 31% were nails. 33% could not be distinguished since the nail element of both was similar. A rivet could only be identified as such by the rove, or by the deformed end of the shank and a nail by the pointed end of the shank. The heads conformed to Bill's classes A, B and C, the shanks to classes A, possibly B, and C and the ends to his classes D, E, F and G (figure 64).

Shank shape	**Nails**	**Rivets**	**Nail/Rivet**	**Total**
Square	73	86	39	198
Round	19	44	33	96
Indeterminate	7	9	--	16
Total	99	139	72	310

Table 21 Fastenings from the Scar boat

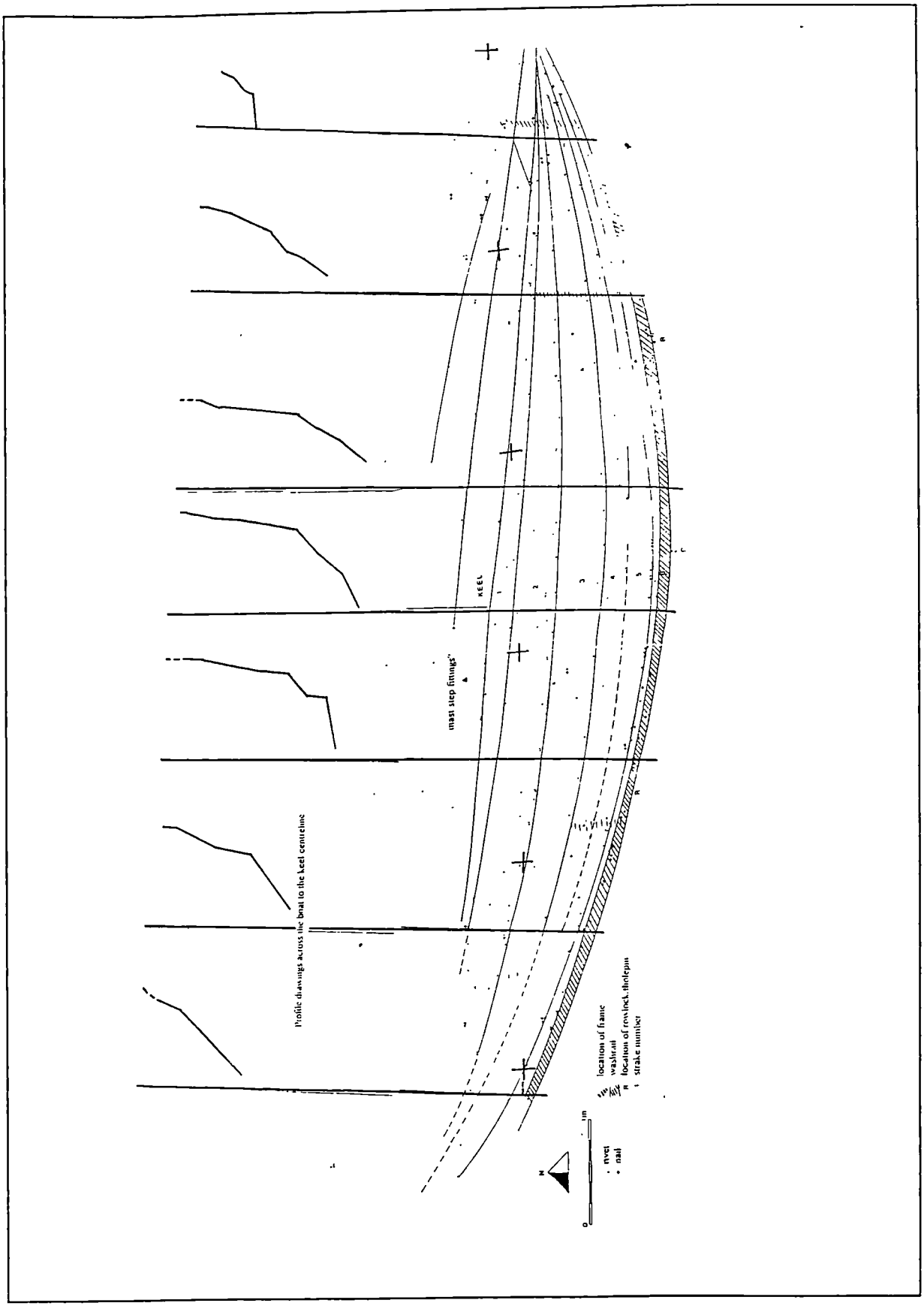


Figure 64 Plan of the Scar boat

The fastenings were distinguished by the shape of their shank: 64% of all fastenings were square and 31% round. The shank shape and predominance of curved roves has important implications for the tradition in which the boat was built and possibly its origin (see below).

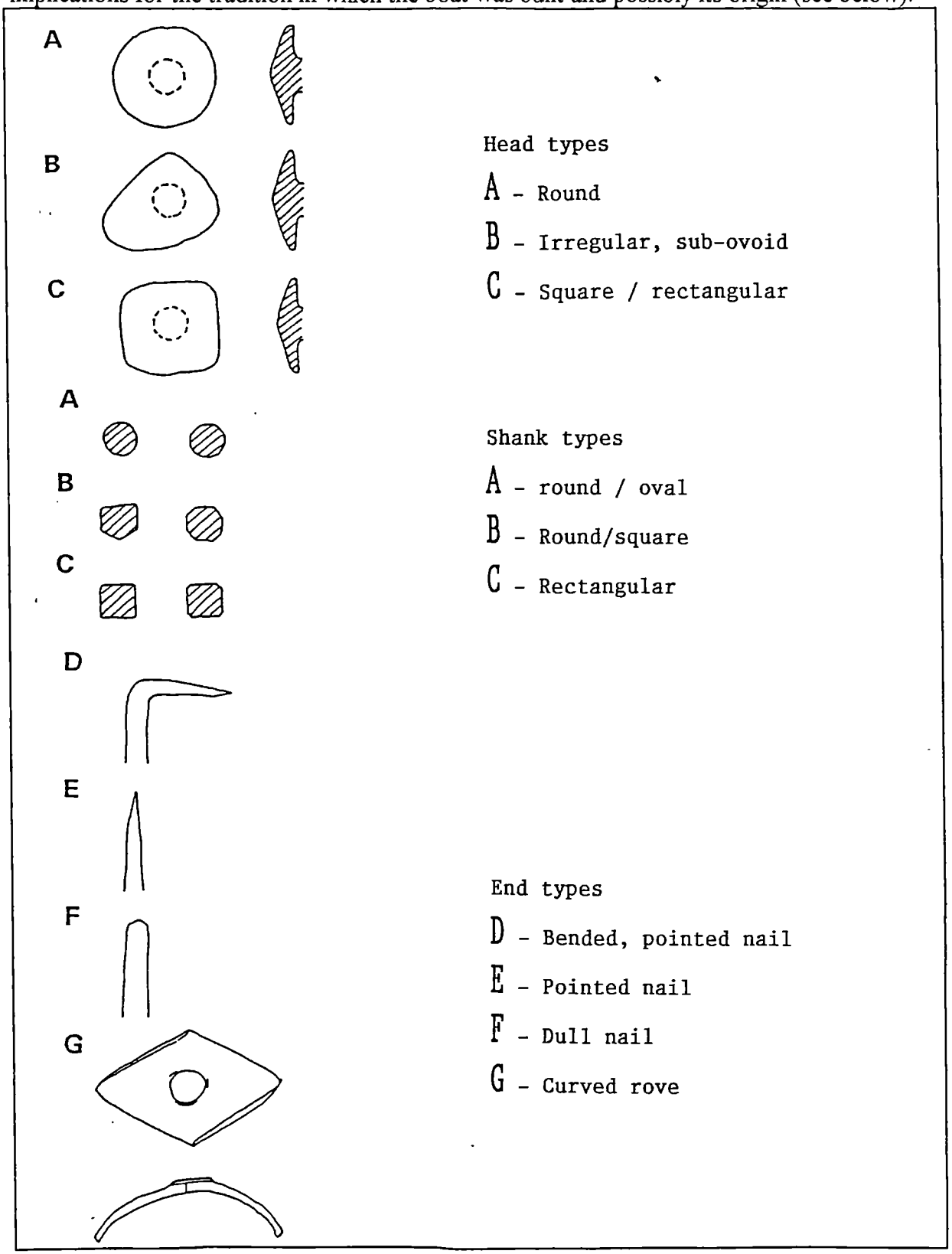


Figure 65 Types of fastening (based on Bill, 1994)

The assemblage comprised three classes of rivets: large which were over 40mm long; standard, about 28mm long; and small, about 19mm long. The nails fell into two groups: large, with a shank length greater than 40mm and between 5 and 7mm wide; and small nails with a shank length of less than 15mm and only 2 or 3mm wide (Watson, 1993). This diversity is not unusual since different fastenings would be used in different parts of the boat. Strakes were fastened to each other through the plank overlap by standard rivets. The internal ribs were fastened to the strakes by both nails and rivets. Long iron nails fastened the tholepins or rowlocks to the washrail which was itself attached with similar nails to strake 6. The strakes were fastened to the stem with iron rivets.

The keel and stems

The surviving part of the keel was T-shaped. The whole keel was about 5.4 metres long, had a maximum breadth of 0.11m and was at least 60mm deep. The point at which the keel was scarfed to the stem at the east end of the boat is not clear. The paucity of fastenings of the planks to the stem may indicate that the stem was a pre-formed stepped stem, like the one found in a bog on Eigg, Outer Hebrides (figure 66; McGrail, 1987, 124), McGrail's type C or possibly type D). In any case not all of the stem survived. It may have projected above the surface of the grave acting as a grave marker and was destroyed quite quickly.

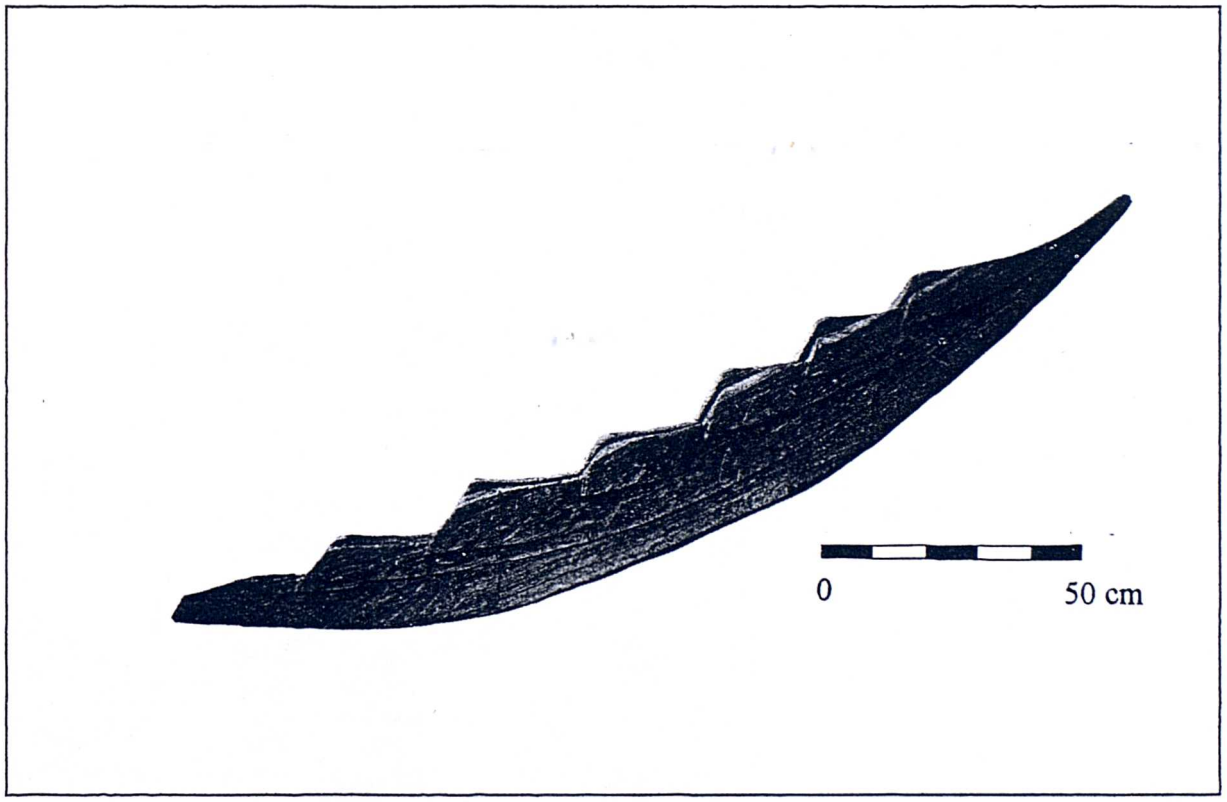


Figure 66 Boat stem found on Eigg, Outer Hebrides (Photo: Barbara Crawford)

Planking

The length of the rivets indicates that the individual planks were between 10 mm and 13 mm thick. This about average for this type of boat (McGrail, 1987, 28). Caulking, probably of animal hair and tar although it proved impossible to identify this, was inserted between the two planks in a specially cut groove to waterproof the seam. The number of planks per strake is less clear since it is difficult to locate the scarfs. At least two or three planks, each about 2 or 3m long per strake seems likely. The breadth of three strakes was recorded in the field. The second strake was 0.22m broad, the third strake 0.23m and the fourth strake 0.24m. The *garboard* or first strake was narrow, only 0.10m broad and was angled sharply to the keel. The fifth and sixth strakes, including the washrail, measured 0.17 and 0.26m respectively. Strakes usually overlapped by 17 to 20mm.

Framing timbers

The boat originally had six frames fastened to the hull to lend strength and to support thwarts for the rowers. The position of the frames is evidenced in the presence of certain nails and rivets which fastened the frames to the planks. Two frames in the east end of the boat and a third in the west are indicated in figure 64. The location of the easternmost frame was identified by a nail (find no. 372) to which was attached the remains of a curved grown timber, possibly a tree branch with traces of a small knot (Watson, 1993). The second frame was identified by two fastenings, a nail from the frame to the keel which contained mineralised oak or pine (find no. 360; McCullagh, 1993) and a second nail from the frame to the topstrake which incorporated the edge of a timber, cut at right angles through the grain (find no. 412). The westernmost frame has been washed away with that end of the boat, and the midships frame was probably removed to make room for the burial chamber. In addition to these frames the boat may have had bulkheads like the ones found in the small boats at Gokstad (Johnannessen, 1940).

Propulsion and steering

The location of three rowlocks or single tholepins was tentatively identified by iron rivets and nails which lay significantly higher than the surrounding ones. An antler tholepin was recovered from one of the two boat burials in the Viking cemetery at Westness, Rousay, Orkney. The Scar boat probably had similar tholepins of wood. Possible fittings for a mast were found just forward of amidships on the top of the keel (find no. 452, figure 64). There were no remains of a sail or oars, but these may have been removed to make room for the burial chamber. All three of the small boats from Gokstad had evidence for sails in the form of mast step fittings and holes in the washrail for shrouds (Christensen, 1959).

Steering was probably by means of a side oar, usually attached to the starboard side of the boat. As there is no evidence for one on the south side of the boat it is reasonable to deduce that it must have been attached to the north east side. This would mean that the prow of the boat faced to the west, as did the bodies of the man and woman. Alternatively, it may also have been removed before burial.

Wood identification

The planks and keel were identified by both soil thin-section analysis and analysis of mineralised remains as oak, *Quercus sp.*, (Carter, 1993; McCullagh, 1994). Four fastenings on the topstrake incorporated Scot's pine, *Pinus silvestris*. McCullagh (*op cit*) suggested that this might be the remains of a canopy which covered the burial chamber. It seems more likely that this was a washrail which ran virtually the whole length of the boat and to which rowlocks were attached. The topstrake of all three small boats found in the Gokstad ship burial in Norway were of pine, although the rest of the wood was oak. The internal frames may also have been of pine, *Pinus silvestris* (see above). The analysed wood remains were all from mature, grown timbers which had probably been worked when green.

6.4.4 Reconstruction

Figure 67 shows the shape of the boat derived from the sections in figure 64 and generated by the computer programme *Boatline 3*D, part of the *Boatcad* software developed by Stan Goldman, University of Aberystwyth. Boat lines were initially drawn by hand and faired. The stem at the east end of the boat had been pushed in and upwards and the sides of the boat amidships has fallen outwards, giving the impression that the boat was much shallower, beamier and flatter than in reality. This was estimated by comparing the boat lines to those of the smallest boat from Gokstad and by following the shape of the lines from the surviving section of the Scar boat. The westernmost surviving part of the boat had also slumped. It proved possible to reconstruct the west end by superimposing on it the east end. This reconstruction assumes that the boat was symmetrical about amidships. The boat was then created on computer by inputting its dimensions and recreating the elevation. The figure is a wire grid view of the interior of the boat generated from the elevation.

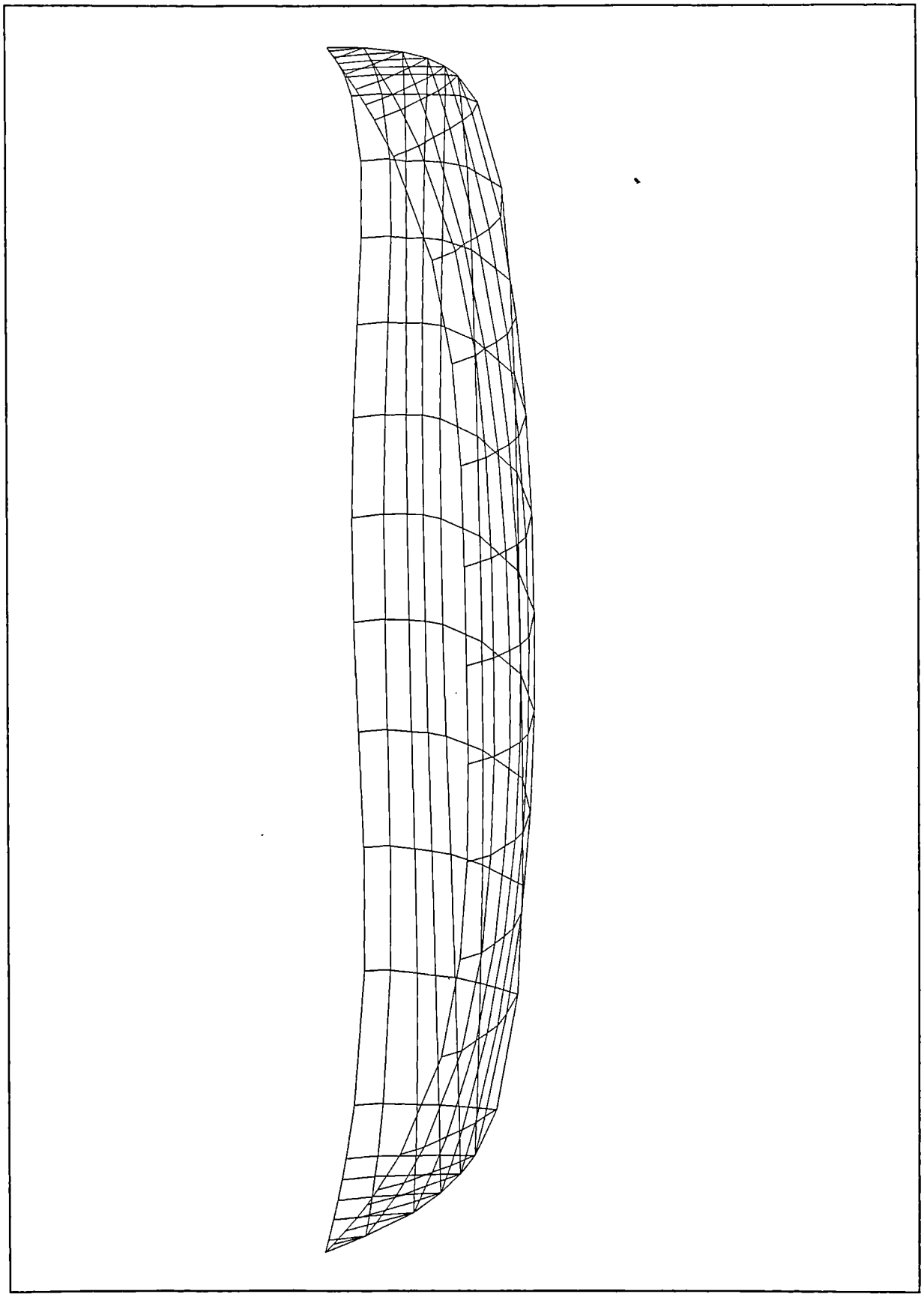


Figure 67 The internal shape of the Scar boat

The boat has a reconstructed overall length of approximately 7.15m of which 0.80m had been lost to the west and 0.20m to the east, where the uppermost part of the stem had decayed. The reconstruction gives the boat a freeboard amidships of 0.60m with a sweeping sheer fore and aft. The details of the outside face of the stem and stern are hypothetical. This reconstruction gives an impression of the form of the boat but its accuracy is limited both by the paucity of data available and the design of the computer programme. No data was recorded in the field of the external appearance of the boat. It was not possible, therefore to reconstruct the stem and keel. In addition the computer programme, which is intended to design yachts with transom sterns had to be modified to produce a double-ended boat.

Assessment of performance

Using the techniques previously outlined the Scar boat had a minimum operational freeboard of 24 cm and a maximum draft of about 36cm (table 22). In terms of stability it is similar to the boats from Westness with a L:T of 24 and B:T of 4.6, indicating that it too was manoeuvrable, but not particularly suited to sailing or carrying cargo. Given that the boat was a *sexæring* (six-oared, based on the position of fastenings), it would have little extra space for cargo than the boats at Westness, although the cargo carrying capacity would have been significantly increased if the craft were sailed, rather than rowed. It could have been operated by a single person. A theoretical speed (based on McGrail, 1987, table 11.1) of between 2.5 and 7 knots might have been achieved, making it faster than the Westness boats.

	Dimensions	**F**	**D**	**L/T**	**B/T**	**L:B**	**L:D**	**B:D**
Westness 1	5.25x1.35x0.60	24	36	14.6	3.8	3.9	8.8	2.3
Westness 2	5.50x1.40x0.45	18	27	20.4	5.2	3.9	12.2	3.1
Scar	7.15x1.38x0.49	19	30	24	4.6	5.2	14.6	2.8

Dimensions given in metres in the following order: length overall, beam amidships, depth amidships T=draft; L=length; B=beam; D=depth amidships; F=freeboard

Table 22 Statistics of Viking boats in Orkney

The identification of sand grains lodged in the caulking

Thin section analysis of sediments sampled at the floor of the burial chamber showed the residues of what were once the strakes of the boat. The remains of caulking were identified in a 1mm wide gap between the strake overlap and this caulking material

contained sand grains (Carter, 1993). Detailed optical examination of the mineral grains identified a complex assemblage of both igneous and metamorphic minerals (table 23; Dixon, 1993). The minerals were subsequently analysed by electron-microphobe to determine their specific chemical composition. The sand grains were evidently trapped in the caulking either during construction of the boat or when the boat was recaulked during repairs or servicing, and so their provenance should reveal either where the boat was built or where it was repaired.

Basic Igneous association	**Metamorphic association**	**Miscellaneous**
Olivines	Amphiboles	Phosphate
Pyroxenes	Garnets	Unknown A.
Feldspars	Epidote	
Spinel	Sphene	
Ilmenite	Haematite	

Table 23 Minerals identified in sand trapped in the caulking

Where was the boat built?

During her anlysis of the sand grains Dixon (1993) considered there to be no suitable location on Orkney, Shetland or the northern Scottish mainland from which such a combination of minerals could be derived. The nearest plausible location was considered by her to be Skälderviken, a prominent bay in Skåne, on the southern tip of Sweden. Unfortunately it has not yet been possible to compare samples from this site with the sand found in the Scar boat. The requisite combination of rock types may occur also in the Western Isles on the islands of Skye, Mull and Rhum (Emeleus, pers. comm.) and there may be suitable outcrops which have not been mapped elsewhere. The analysis was based upon a single sample and it is just possible that this represents a repair to the boat, rather than the original hull. Further analysis is necessary before it will be possible to come to any conclusion.

Unfortunately analysis of the fastenings does not clarify the issue for while square-shanked rivets are a characteristic of the Baltic area in the Viking period (Bill, 1994), the curved roves on the rivets are characteristic of finds in the Western Isles and the Irish Sea. Bill identified these roves on the boat burials at Kiloran Bay, Colonsay and Knoc Y Doonee, Isle of Man. Where these roves are found elsewhere they are used specifically to fasten the upper end of a rib to planking.

Oak (*Quercus sp.*) and Scot's pine (*pinus silvestris*) are found both in western Scotland and in Skåne, Sweden and so it is not possible to distinguish the place of manufacture on the basis of available materials either.

Dixon (1993) refers to a known boat building site near Skälderviken in Skåne. There is no such site. The nearest boat find is at Foteviken, excavated by Crumlin-Pedersen between 1981 and 1983 (Crumlin-Pedersen, 1984). Two phases were identified: Late Iron Age and early twelfth century. Five boats were found, one measured 11m, the others could not be reconstructed. The site type, period of use and type of craft (cargo boats) all differed markedly from the Scar boat.

The Scar boat is longer, beamier and deeper than the færing from Gokstad which was just over 6.5m long, 1.38m in beam and 0.49m deep amidships and comprised only three broad strakes between 0.28m and 0.38m wide. The possibility that the Scar boat may have come from southern Sweden is intriguing. The family burial may well be the grave of first generation settlers (based on the date of the whalebone plaque, though this may have been an heirloom) and if this is the case they may well have been buried in the boat in which they arrived. The rivet patterns showed evidence of repair, so this was certainly not a special ceremonial craft. On the other hand, the curved roves paralleled in boat graves from the Western Isles perhaps point to an independent insular building tradition in the Scandinavian colonies in the Northern and Western Isles in the 9th century.

Judging by its size and limited cargo-carrying capacity the Scar boat was probably used in inter-island transport and fishing. It was capable also of longer journeys in open water and might have carried a small cargo, such as a couple of sheep, peat or grain, or one or two passengers.

6.5 Recent vernacular building traditions in Orkney

The aim in studying the vernacular craft of Orkney was to interpret the archaeological data by comparing them with modern data under similar conditions. The environment of Orkney has changed relatively little (chapter 3) since the beginning of the second millennium A.D., and until early this century was not markedly affected by the industrial revolution. There were no railways or heavy industries and steam ferries did not arrive until the 1950s. The main occupations were farming and fishing, and the main form of transport was wooden boats. With the exception of some boats designed for the herring fishing industry, the design of boats was influenced by the same factors which had governed boat design six or more centuries earlier, namely the environment, availability of raw materials, boat function, personal or builder's preferences, economic and social factors.

In this section the extent to which vernacular boats suited, or were modified to suit, their function and environment is explored, along with modes of production, the social background of that production and evidence for continuity in practice since the Medieval period. The modern craft of the Northern Isles, in particular those of Shetland and Fair Isle, have often been compared to Viking craft and their striking similarity to each other has generally been explained as a direct continuity of boat building practice to the present day. Christensen and Morrison (1976), Henderson (1978), for example, compared the Gokstad *færing* and a reconstruction of it made by the National Maritime Museum, in structure and performance with the *Dunrossness (Ness) yole* from Shetland, and also with the Shetland *fourareen*.

This survey is drawn primarily from fieldwork by the author of extant craft, conducted in the summer of 1992. Unpublished notes made by the well known Norwegian boat specialist Bernard Færöyvik during a trip to Orkney in 1950 were kindly provided by his son Öystein Færöyvik and these added some extra details. Valuable information about the use of the boats and their performance was provided by various Orcadian boat builders and users.

In modern practice in the Northern Isles a range of recognised boat types was developed for different purposes. These include the *Great Boat*, *Westray skiff* and the *North* and *South Isles yoles*. In addition to these types there are several which were adapted from boats from other countries about one hundred years ago: the Stromness *flattie* (based on the *Newfoundland dory*) and the *North Ronaldsay pram* (derived from the *Norwegian pram*). Transom sterned dinghies called lurkies and sooies were used in the South and North Isles respectively.

The earliest description of an Orkney-built boat comes from a document placing an order, dated 6th August 1662, for a great boat to two Stronsay men from one Thomas Baikie of Kirkwall (Marwick, 1927b). Gibson (1984, 44) produced an impression of the

appearance of the boat (figure 68). It was to have a keel length of 30ft (9.14m) and would therefore have been about 40ft (12.2m overall). With a burden of six or seven tons it was furnished with six oars and three thwarts. It was to be sturdily built of six heavy oak strakes below the gunwale and was to be decked over the forward end and fitted with a stern rudder. From the keel length and the specified number of strakes one can assume that this was to be a shell-built craft, probably in the clinker technique. The shape and dimensions such as the beam and depth amidships were not specified but were apparently left to the builders' discretion. Similarly there was no mention of the framing or fastening systems to be employed, nor any reference to the design of the oars or rudder, other than that it should hang from the stern and be provided with a tiller. Clearly the customer was familiar with this type of craft and was happy to leave most of the details to the builders' judgement, provided that the final product was of the requisite size.

This indicates that the craft was one of a class of "great boats" which were built to a standard design by a particular boatyard, presumably using handed-down moulds or rules of thumb, learnt from experience and modified according to the size of the craft which was to be built. Great boats were one of the largest class of Orkney merchant craft used for exporting grain from Stronsay to Shetland and Norway, although manufactured in Orkney, they undoubtedly used imported timber.

Estimating an overall length of about twelve metres and given that the cargo boat was probably quite beamy and deep, only six oak strakes is relatively few, a characteristic common to the Viking craft from southern Norway and from Westness, Rousay. The use of a stern rudder shows a change from the side rudder of the Viking period, but the fact that it is specified that the rudder should be "hung back" suggests that side rudders were still in use. The great boats had two masts, a divergence from the medieval use of only a single mast, even on the large ships found at Skuldelev. The provision of two masts would have required greater beam and a deeper keel for stability. Orkney *yoles* were also beamy, double masted and fitted with an extra *false keel*. Although the evidence is slim, this hints at a continuity and gradual development in boat building in Orkney from at least the seventeenth century.

During the sixteenth and seventeenth centuries boats were also imported into Orkney from Norway. This export continued into the eighteenth century. In 1773 one Jas Fea of Kirkwall commissioned, on behalf of one Henry Pollexfen Jnr. and himself, four boats from Bergen for fishing off the coast of Shetland (Orkney Archives ref. D3/165). Thowsen (1970, 56) suggested that it was a break in trade relations with Norway, caused by the Napoleonic Wars which triggered the beginning of local boatbuilding in Shetland (and possibly Orkney), but it is obvious from the great boat account that boatbuilding was already

well underway in Orkney in the seventeenth century. After the Napoleonic Wars the trade between Shetland and Norway was resumed, but this was apparently not the case in Orkney.

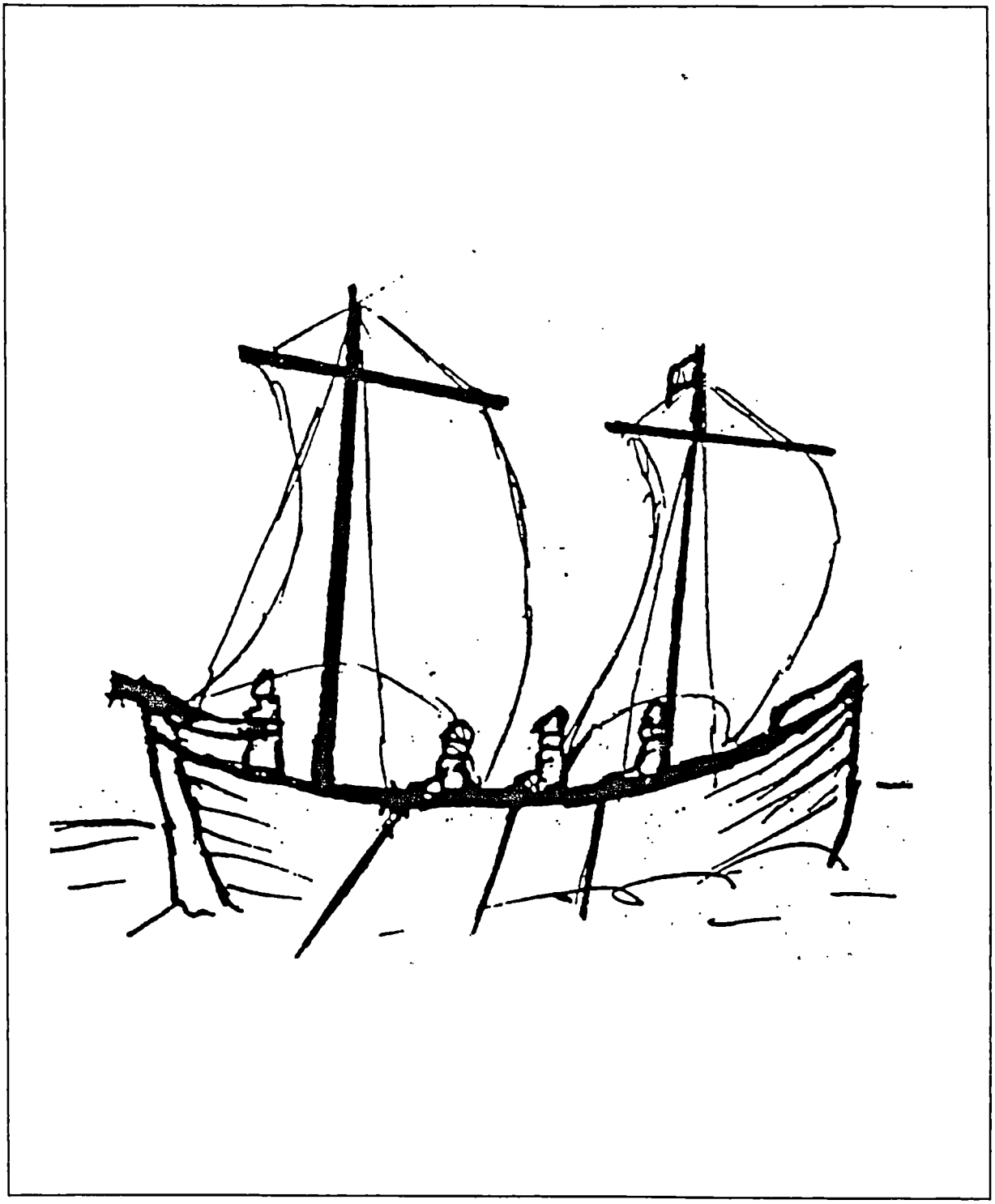


Figure 68 Stronsay's Great Boat (after Gibson, 1984, 44)

6.5.1 The Orkney yole

Johnstone (1936, 469) traced the *yole* (derived from the Old Norse term *yolle*, meaning a small boat with sprit sails) as far back as the early eighteenth century. The account of the great boat shows that it was under development already in the seventeenth century and he derivation of its name alone suggests a much earlier origin. Thowsen would probably class its derivation along with that of Shetland *sixerns*, *fourareens* and *Ness yoles*, as fairly late adaptations of craft from Sunnhordland, the area of Norway which was exporting boats to the Northern Isles from the sixteenth century. This study shows, however, that the Orkney *yole* is very different from Shetland boats.

There are two types of Orkney *yole* - *North Isles* and *South Isles yoles*. The northern type is sometimes confused with the *Westray skiff*. Wilson (1965, 23) described them as *yawls*, a generic term which simply means a small boat. White (1952, 31) described the difference between the two simply in terms of rig: two standard jugsails in the north and spritsails in the south. There are, however, also differences in the shape and construction of the craft. These were highlighted in a detailed survey of the craft from each area (table 24). The southern *yole* was beamy and shallow, whereas the ratios for the northern type fell into the normal range. The southern *yole* had bilge keels, whereas the northern type did not, but a false keel, locally called *greenheart* was found in both. Grown single and composite timbers were used in a fittocks and halfocks arrangement on the Sanday *yole*. Here alternate ribs spanned topstrake to second strake and sixth to sixth strake. On the *Daisy* from Flotta steamed bands spanned topstrake to topstrake. This was evidently a more recent practice, as it was cheaper and easier to build, but more ribs were required to give similar support to the hull. The number of strakes and length of planks used in the two craft were not similar and in both cases thwarts sat on a stringer. Iron fastenings were used in both and stern rudders were fitted with tillers. The inserted tiller on the *Lizzie* from Sanday is a more recent replacement and it would originally have had one similar to the *Daisy*, as shown on a photograph taken in 1950 from Tom Kent's collection in Kirkwall library (ref L 176/2; figure 69). Honeyspots or breasthooks were found at the stem and stern of both boats.

Several of the differences represent temporal changes in construction technique, but it is clear that the form of the craft was also quite different, and this must reflect their function and environment of use. The *South Isles yole*, intended to work mainly in the sheltered waters of Scapa Flow, could afford to be shallower, its greater beam providing a larger working platform, whereas the *North Isles yole* was sufficiently deep and beamy to take a large load and have a good grip on the water under sail.

	Sanday yole Lizzie *North Isles yole*	*Flotta yole Daisy* *South Isles yole*
History	Built in Sanday by Thomas Omand in 1870s	Built at Longhope, Hoy c. 1890
Use/Environment	Fishing around North Isles	Lobster fishing in Scapa Flow
Construction	Keel, shell, clinker	Keel, shell, clinker
Dimensions	Lgth - 4.35m L:B 2.2 (normal) Beam - 1.84m B:D 2.45 (normal) Depth - 0.75m L:D 5.6	Lgth - 5.05m L:B 2.53 (beamy) Beam - 2.00m B:D 3.08 (shallow) Depth - 0.65m L:D 4.40
Keel	Lgth 3.26m Dpth 0.08m T-shaped; false keel	Lgth 3.78m Dpth 0.11m T-shaped; false keel
Bilge keels	Absent	Present on 6th strake
Strakes	9 below gunwale	10 below gunwale
Planks	2-4 per strake 1.5-2m long	1 in garboard strake, 3 in others 2-2.5m long
Framing	13 ribs, fittocks & halfocks Grown, single piece and composite Stringer 4 thwarts, knees to gunwale	17 ribs, topstrake to topstrake Bent, single piece and composite Stringer 4 thwarts, knees to gunwale
Fastenings		
Strake to strake	Iron rivets	Iron rivets
Ribs to strake	Iron rivets	Iron rivets
Tholepins to strake	Iron rivets	
Rudder	Iron pintles, copper brackets	Iron pintles and brackets
Strakes to stems	Iron rivets	Iron rivets
Steering	Stern rudder with hole cut for tiller	Stern rudder with tiller fitted over top
Propulsion		
Sail	2 masts - 0.70 & 2.45m aft	2 masts - 0.73 & 2.58m aft
Oars	originally 2 pairs in wooden double tholepins	2 pairs in double iron rowlocks

Table 24 A North Isles *yole* and South Isles *yole* compared

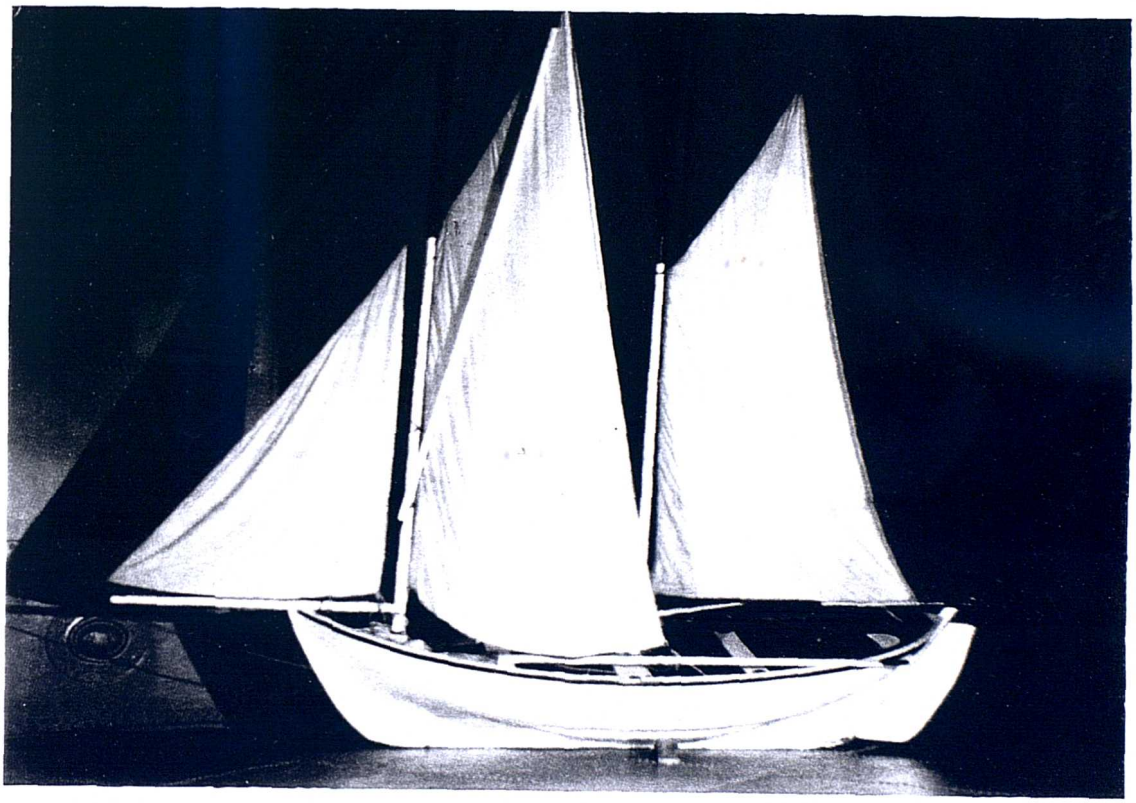


Figure 69 North Isles *yole Lizzie* (Tom Kent Collection, Kirkwall Library ref L 176/2)
South Isles *yole Daisy* in Lyness Naval Museum

Unlike the *Ness yoles* of Shetland there was evidently much variation in those built in Orkney. Conversations with several fishermen who have used yoles gave information on how the boats were constructed and used to their maximum potential. There are many similarities between modern and medieval boat building practices in Orkney, though yoles were primarily sailing rather than rowing craft.

Figure 70 compares the shape of Viking period and modern craft from Scandinavia, Orkney and Shetland. Orkney *yoles* and Shetland *sixerns* form a clear group, distinct from the Viking craft and representing two ends of a continuum. There are a number of outliers which fit more closely with Viking craft. Viking craft from Orkney fit within the broad range of shapes found in medieval boats in Norway. The wide range in length to depth ratios represents a greater variability in the form of craft, determined in part by the function and working environment of the boat, than is seen in recent vernacular building traditions. One might anticipate such variation if each settlement or island was building their own boats, rather than relying on a particular boat yard or itinerant specialist. On the basis of vernacular practice and the evidence of medieval boats in Norway there is no doubt that boats would be built in a variety of forms to suit varying traditions and environmental factors.

Summary

A local boat building tradition?

All three Orkney Viking boats varied from each other in their form, the Scar boat more than the two from Westness. The Scar boat was perhaps imported from Scandinavia, based on the evidence of the sand grains found lodged in caulking. I would argue, however, that the two from Westness, buried perhaps two generations later, based on the dating of the grave goods, were rather the product of a local tradition. These boats had smaller length to depth ratios than the Scar boat and were similar in this respect to more recent Orkney vernacular boats. Such a shape was evidently better suited to the waters around Orkney.

It does not seem unreasonable to propose that there was a local boat building industry. The inhabitants would have had to have been self-sufficient to a degree, since they would lose contact with Norway over the winter. At the very least boats must have been repaired there using either imported wood or the limited local supplies. The native inhabitants of Orkney must already have had boats prior to the Viking settlement. One clue to the appearance of pre-Viking boats might be found in the antler rowlock and chafing piece from Westness 1. Another chafing piece was found at the Broch of Burgar, Evie on Mainland Orkney (figure 60). Was this a feature borrowed from the local boat building tradition? A similar chafing piece was found at Jarlshof, Shetland (figure 60). Pictish

symbol stones from the Scottish mainland depict wooden plank-built boats (Ritchie, 1993b, 71) and there is no reason to suppose that they were not also built in Orkney.

The local construction of boats also implies the presence of attendant crafts such as woodworking and smithing and possibly rope and sail manufacture, as well as antler working to produce rowlocks and chafing pieces.

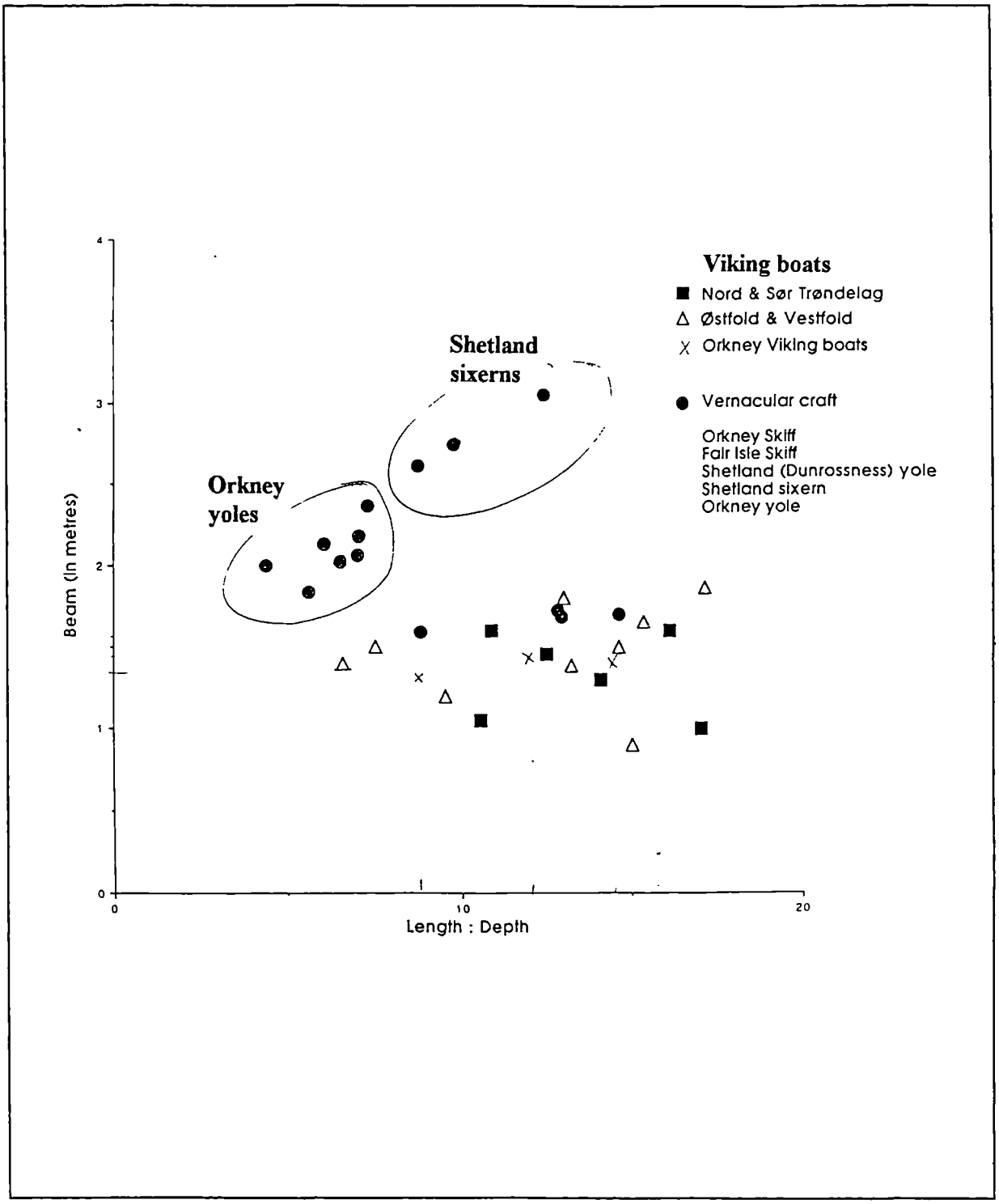


Figure 70 Ancient and modern boats compared

The range of craft and their uses

No large cargo ship or any type of warship or large ferry dating to the Viking or Late Norse periods has been found in Orkney, but this does not mean that they were not used. The provision of formal landing facilities at Kirkwall, for instance, indicates that vessels requiring berthing called there. The transport of building stone must also have involved boats larger than those so far excavated.

The five eleventh-century ships discovered at Skuldelev, Roskilde Fjord in Denmark (figure 71) indicates the range of craft which, together with the local small boats, probably operated along the sea routes around and within Orkney. There were two cargo vessels, two warships and a ferry or fishing boat, all of which were significantly larger than the boats hitherto found in Orkney. The smallest was 12m long and the largest, a longship, was 28m long.

Specialist cargo ships had already been developed in the ninth and tenth centuries. Examples have been found at Klåstad, Norway and Äskekärr, Sweden. It has been estimated that Skuldelev 1 could carry 4.6 tons of cargo and Skuldelev 2 2.4 tons.

Warships

The provision of warships may have operated as a naval levy system, similar to that historically attested to in Norway, and supported by the work of Bjorn Myrhe (1985). He considered the juxtaposition of burial mounds and large boat houses to indicate administrative districts or *skipredes*, each of which was required to supply a ship in times of national emergency. Storer-Clouston (1928) and Marwick (1935) proposed a similar system for Orkney, based on the account of the Battle of Tankerness in the *Orkneyinga Saga*. So far no large boat houses which might have housed these large warships has been found. Clearly the necessity to build, crew and provision warships would have economic implications. As yet, however, there is no archaeological evidence to support the existence of such a system in Orkney.

This chapter described four Viking boats found in Orkney. It has been possible to estimate the size, method of construction and performance characteristics of three of these even where the preservation was so poor that only mineralised wood survived. Unfortunately, all four boats had been removed from their primary context of use to serve as coffins. It was necessary, therefore, to determine their original function from their size, shape and surviving boat fittings. The two boats from Westness and the boat from Scar were probably, fishing boats or ferries, perhaps involved in inter-island trade. Too little survived of the fourth boat from Pierowall, Westray to determine its use. Of the other types

of boat which existed, principally warships and cargo ships, little is known. The *Orkneyinga Saga* records the King of Norway's gift of warships to the Earl of Orkney and there is indirect evidence for the use of cargo ships in the shipment of stone to Kirkwall for the construction of St. Magnus Cathedral. To judge from the material recovered from the waterfronts at Dublin and Bergen further excavations on the line of the Viking waterfront in Kirkwall might reveal parts of ships' timbers. The issue of whether boats were the product of a local or foreign building tradition might be answered by dendrochronological analysis of surviving timbers. To date too little wood has survived to attempt identification.

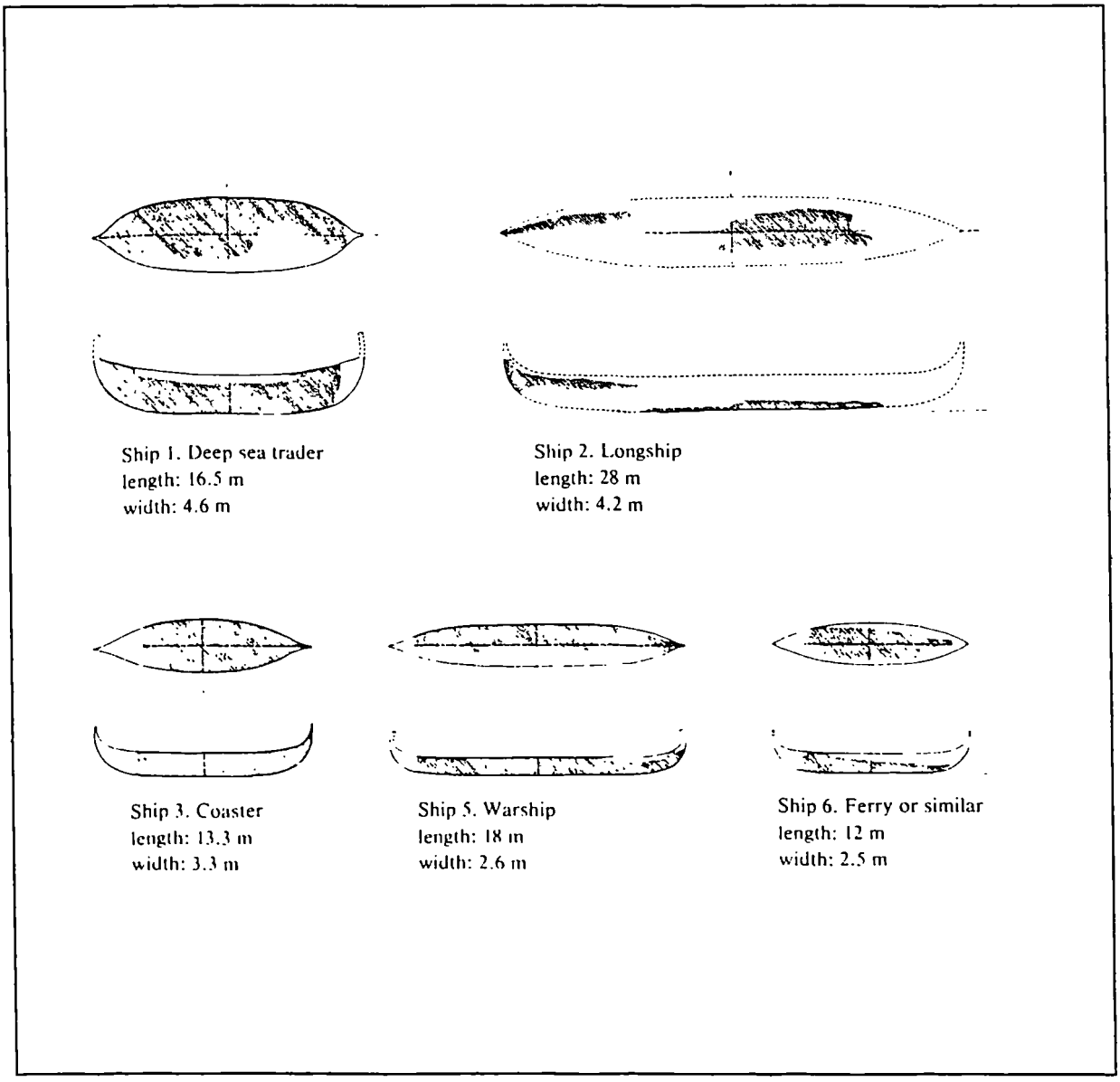


Figure 71 Five Viking ships from Skuldelev, Denmark (after Crumlin-Pedersen, 1978)

CHAPTER 7 Conclusions and suggestions for future work

Conclusions

This thesis has identified a maritime cultural landscape in Viking and Late Norse Orkney evidenced by a coastal settlement pattern; the construction of maritime structures on sites; the importance of beach and offshore resources to the diet and the reliance upon sea communication routes in local and long-distance exchange networks. Taking into consideration coastal change since the ninth century, 70% of gazeteer sites lay within 250 metres of the coast and were easily accessible from the sea. In the archaeological record there emerges for the first time in the Viking period a distinctive maritime cultural landscape evidenced in the coastal settlement pattern, the appearance of maritime structures, increased exploitation of marine resources and the importance of sea transport in inter-island and long distance exchange networks. *That is not intended to* imply that the Pictish or indeed the Stone Age inhabitants did not exploit marine resources or own boats. Indeed the settlement of the islands would not have been possible without boats, since there was no land bridge between Orkney and Caithness, and both inshore and offshore species of fish occur in faunal assemblages on prehistoric sites. Although settlements were located on the coast from the earliest times, there is as yet no evidence of slipways, harbours, jetties, boat houses and sea marks etc. In chapter 4 an increase in the exploitation of marine resources in the Viking period was demonstrated. This might, in part, be accounted for by an increase in the population.

In the absence of new data, the survey of coastal change presented in Chapter 3 had to rely upon the use of archaeological evidence and written statistical accounts from the eighteenth century to assess coastal change. Both erosion and deposition were evident. At the Brough of Birsay excavated building plans showed quite clearly how much of the site had been lost to the sea. At Kirkwall, on the other hand, there has been considerable reclamation of land from the Peerie Sea. The Viking period waterfront was situated much closer to the Cathedral than it is today. Elsewhere, the shores around South Ronaldsay, Burray and the southern Mainland have accreted in places and eroded in others following the construction of the Churchill Barriers in World War II. The full impact of these changes is not yet clear, but interviews with local inhabitants suggested that the closing of the eastern approaches to Scapa Flow is still causing flooding along the coast of Orphir and sand loss as far away as Evie in the northern Mainland, whilst sand is accumulating to the east and west of the barriers.

There is reason to believe that fishing intensified, and may even have operated as an industry during the Late Norse period. Bigelow (1985) argued this case on the basis of four sites in Shetland and two possible Late Norse fisheries have been investigated in Caithness at Freswick (Batey, 1987a) and Robert's Haven (Barrett, 1994). The large

quantity of fish bone recovered from Tuquoy, Westray, over 140,000 fragments (Colley, 1988) has been interpreted as evidence for a similar fishery in Orkney. At Buckquoy (Wheeler, 1977) and the Brough of Birsay (Seller, 1986) the quantities of fish bone recovered also increased in the Late Norse period.

The interpretation of fish bone assemblages is, however, frought with difficulties due to variations between sites in original disposal patterns, preservation factors, recovery procedures and the subsequent analyses of the assemblages. These problems were outlined in Chapter 4. The excavation of a settlement at Hope Colony, Greenland where written records attested to the importance of fish in the diet, for example, produced very few fish bones. The excavated assemblage implied an economy based rather on cattle and sheep rearing.

Few sites in Orkney have been excavated to the same standard, using the same recovery procedures and most have concentrated on the core of the settlement rather than the peripheries, where fish waste was more likely to be deposited. It is difficult therefore to directly compare the relative quantities of remains recovered from these sites. In Chapter 4 I suggested one means by which this problem might be tackled - to calculate the relative density of remains per m^3 of excavated or seived soil, although this technique cannot account for differences in the original disposal pattern between sites. This issue might be addressed in future work.

The sea was an important means of transport. The survey of evidence for trade and exchange presented in Chapter 5, the first comprehensive survey for this period in Orkney, showed that sea transport accounted for a minimum of 32% of material found on sites. The uneven distribution of natural resources within the island group necessitated inter-island trade in copper, iron, peat, lead and stone. Other natural resources including seal colonies, seabirds and fish were also distributed unevenly. Their distribution today may be different from that in the Viking period so it is not possible to determine from the archaeological record where these remains arrived at sites as a result of trade rather than local exploitation. Steatite, silver, gold, jet, oak and pine, coins, pottery and tin arrived through long-distance exchange with Shetland, Norway or further afield.

The approach adopted to analyse exchange and trade relied, due to lack of published information, on recording the presence and absence of different categories of material on sites in the gazetteer, and identifying their origin as either indigenous or foreign. Whilst the scale of trade measured in the quantity of traded goods found appeared to be small, the survey demonstrated that it was, nevertheless, widespread. Foreign materials were found at 65 of the 134 sites for which information was available and represent 32% of all material recovered from sites. In reality that figure is probably higher since inter-island trade in perishable goods such as wood, leather and peat is likely

to be under-represented. There is a need for comparative data from places such as Dublin and York to determine whether the pattern established in Orkney is locationally specific or not.

A variety of modes of exchange may have operated in Orkney: direct access, reciprocal exchange, down-the-line trade and market exchange. Some of these are described in written sources, but were not identifiable in the archaeological record. It did, however, prove possible to distinguish goods traded regularly and in (relatively) high volumes, including copper alloys and steatite, and goods of low volume, intermittent, but possibly high value exchange, among them pottery, jet, wood, gold, silver, amber, stone and coins. Invariably these goods arrived at sites by boat.

At the time of researching this thesis very little was known about Viking boats in Orkney. The most recent discoveries had not been published and the only other evidence was a collection of rivets, largely undocumented, from nineteenth-century excavations. It was fortuitous that in 1991 another boat grave was found eroding out of the shore on the northern island of Sanday.

The study of this boat together with contemporary boats in Norway and vernacular traditions in Orkney, outlined in Chapter 6, has led to new ideas about small boat building traditions in the Viking period. It now seems likely that small boats were built locally to suit local environmental factors along the coast of Norway, within Orkney, the Western Isles and Ireland. Boats from each of these areas differed in the types of fastening used, in their shape and scantlings, although all shared the key characteristics of the *Nordic* tradition, being clinker-built, double-ended, narrow, opoen boats with a keel, more suitable for rowing than sailing. Different local traditions were identified in two areas of Norway: in the south around Oslo and in the west around Trondheim. This is mirrored in vernacular practice in Norway. Distinct types of small boat also existed within Orkney in recent times, although they are going out of use now. This may also have been the case in the Viking and Late Norse periods. Certainly the four ninth century boats which have been found differed from each other in shape, but the significance of this remains unclear.

Suggestions for future work

There is much scope for further research into Orkney's maritime cultural landscape. Our knowledge of settlement distribution remains incomplete. Only a handful of maritime structures has been excavated and these do not conform in plan to others found in Scandinavia. A programme of coastal survey, selected excavation and underwater work is needed to recover new information and to identify sites at risk from coastal erosion.

A comparison of the material evidence from Orkney with other Scandinavian colonies reveals that many types of site found elsewhere are missing from Orkney. These include wrecks, anchorages, jettison sites, blockages and harbour defences, navigation beacons, fish-drying sheds, boat building sites, sea walls, fish weirs and stake nets, causeways, canals, fish ponds, salt pans, tidal mills and water wheels. Many of these must have existed in Orkney. For example, portages and beacons are indicated in the place-name record and a single example of a ballast site, though undated, was discovered during fieldwork.

Two known sites merit further investigation. Excavation of the Viking period waterfront at Kirkwall would undoubtedly provide further information on Viking Age trade and exchange in the capital town of Orkney and in this respect excavation to locate the possible Viking harbour at Pierowall is also a matter of priority.

Coastal survey might also locate the missing midden sites discussed in Chapter 4. Middens, particularly those containing smelly fish waste, were likely to be situated at some distance from the settlement. Fish processing sites, like those found at Robert's Haven and Freswick in Caithness might also be located through coastal survey. To aid the recovery of fish bones from archaeological sites samples should be seived through a mesh no greater than 3mm. In addition all clay soils should be wet-seived and a certain proportion of all contexts across a site should be sampled.

The relative importance of marine resources to the diet might be resolved through analysis of human bones from the excavated but unpublished Viking and Late Norse cemeteries at Westness, Rousay and Newark, Deerness. Chemical analysis of trace elements, particularly calcium and strontium and isotopes of nitrogen and carbon are thought to reflect diet, though there is some question of the effect of the burial environment upon the quantity of the various elements which survives (chapter 4). The use of this technique in combination with more rigorous and standardised excavation collection procedures and the subsequent quantification of marine assemblages should go some way to demonstrating the extent to which the Viking and Late Norse economy was dependent upon marine resources and how this varied geographically or over time.

Coastal survey is unlikely to contribute new information on the materials being exchanged in Viking and Late Norse Orkney, though the discovery of new sites would add to knowledge of the extent of exchange. The largest range of exchange goods was recovered from excavated sites. The excavation of different sites, rather than continuing excavation at the same sites is therefore required in future.

Large boats and ships remain to be found in Orkney. The four small boats all survived in boat graves and were probably built for fishing and ferrying. They were not designed to carry large cargoes. The construction of a waterfront with at least one jetty

at Kirkwall suggests that larger boats existed. The *Orkneyinga Saga* also recorded the use of warships, though none has been found.

The excavation procedures employed during the excavation of the four Viking boats found in Orkney were deficient. No plan or detailed written record was made of the boat found at Pierowall in the nineteenth century. No plans have yet been published of the two boats from Westness. Although a comprehensive plan was made of the Scar boat no sections were cut through the bottom of the boat to reconstruct its external appearance. As a result we do not know the height of the stems, the depth of the keel or if there were any external fittings. In the event that another boat burial is found it would therefore be important to record the orientation of rivets by locating in three dimensions the top and bottom of every fastening in order to determine which fastenings remain *in situ*. Since so little is known about Viking boats in Orkney, not least the issue of whether they were produced locally or imported, the discovery and careful recording of future finds is a matter of particular importance.

The rate and dynamics of coastal change in Orkney since the Viking and Late Norse periods remain little understood. The first station to record the height of tides was set up only three years ago and as yet there are insufficent data to establish the current trend in sea level change, although globally it is expected to rise between 0.56m and 3.45m by the year 2100 (Tooley & Shennan, 1987, 131). In the last two years the Orkney Islands Council established a series of fixed markers from which to measure changes to the coastline together with the extent of coastal erosion. The results of this work will be critical not only in evaluating and monitoring current changes and their effects on archaeological sites, but also in modelling past changes.

Ideally the system of monitoring of coastlines which has been established by the Islands' council, should involve archaeological coastal surveys similar to the survey by the writer which was described in Chapter 3. The Scar boat on Sanday is just one example of an important archaeological site which was discovered by chance when it was already half-eroded, ten years after it was first identified and decided not to be under threat. A system of coastal monitoring would identify areas under immediate threat of erosion and would reveal new sites. Realistically the only way to preserve these sites is by record or in exceptional cases through the construction of coastal defences, though these cause erosion on neighbouring "soft" coasts.

It is possible to reconstruct hypothetical exchange and transport routes from the distribution of goods, current and tidal patterns. In future underwater archaeology might verify these routes through the identification of wrecks, anchorages and jettison sites. Fishermen's records of net fastenings often contain the locations of archaeological features snagged by their nets. A range of techniques can be employed to investigate such fastenings, including remote sensing surveys using magnetometers, side scan sonar,

sub-bottom profilers and remote operated vehicles mounted with video and stills cameras as well as diver searches.

In addition to suggestions for archaeological work further research into the dating and origin of maritime place-names is needed. Plotting the distribution of certain classes of these names which describe natural coastal features as well as settlements and fields may reveal areas of maritime activity and transport routes. Names ending in *-ness* which means headland in Old Norse, for example, are scattered throughout the island group in pairs, seemingly identifying landing places and coastal sailing routes. This place-name is common throughout Scandinavia and the Low Countries, but may be post-medieval in origin (McKinnell, pers. comm.). Similarly many Old Norse words for parts of a boat survive in use with the same meaning today. It would be valuable to find out if it is possible linguistically to trace a direct descendancy between the two, or if the modern usage is related to the import of boats from Norway in the seventeenth and eighteenth centuries. These studies require language specialists and are therefore beyond the scope of the present work.

This thesis has achieved its aims in introducing the concept of a maritime cultural landscape to Viking and Late Norse Orkney and exploring the evidence for its existence in terms of: the range and distribution of archaeological sites; the dynamics of coastal change, their effect on the preservation of sites and the extent of coastal change since the medieval period; the subsistence economy and the extent to which it was marine-based; exchange networks and the importance of sea transport and evidence for the use of boats. There is much scope for further research and the results of this will doubtless revise some of the ideas presented here.

Appendix 1 - Gazetteer of Viking and Late Norse sites in Orkney

This gazetteer is designed to be an index to sites organised in a manner convenient for use with this thesis. The descriptions are not intended to represent the definitive word on each site. The references indicate where to go to for further details. Where fields are blank the relevant information was not available. Data were collected until September 1994.

1. **Site name** - This is a convenient handle by which to identify the site and indicate its location. Where this is also the accepted name of the site further details are given in the field **place name evidence.**

2. **Site categories** - The category headings describe the function of a site as closely as possible. It is possible for one location to boast more than one category of site; at the Brough of Birsay, for instance, there is a ***maritime structure, settlement, chapel and cemetery***.

Settlement

Usually a *farmstead*, indicated by the presence of longhouses and an archaeological assemblage showing the exploitation of plants and animals. The term is also used to describe any apparently *domestic site*, which might be indicated only by the discovery of midden material.

Maritime structures

This category encompasses a range of structures: boat *nausts*, comprising a boat house, slipway and landing place; *slipways* found separate from nausts; *harbours*, either artificially enhanced or unaltered natural havens where there is some local tradition or other evidence indicating use in the Medieval period; *ballast sites* where ballast was dumped or stored and *beacon sites* whose fires guided boats.

Burial

A *cist grave*, *flat grave* or *boat grave* with or without accompanying grave goods.

Hoard

A cache of precious metal artefacts.

Isolated find

Often 'chance' finds, apparently isolated, but which may belie the location of a site.

Chapel

There are two types of chapel, those occupied by Celtic priests (often indicated by *Papa* place-names) either before or during the Medieval period and therefore of ecclesiastical

origin, and those of secular origin, built by wealthy landowners for their own convenience and to which access was usually by sea.

Defensive

A defensive structure such as a tower which may be part of a chapel or settlement site.

Monastery

Of Celtic or Norse clergy.

Cemetery

A cemetery is distinct from a ***burial*** only in the number of graves found, to save describing individual burials separately. More than two burials are described as a ***cemetery***. At Scar, Sanday (gaz. no. 45) there were three interments in a single ***burial.***

Thing

The site of the regular general assembly meeting.

Runes

Viking runic script finds occurring where Viking settlement is otherwise unattested. Where runes occur on other categories of site they are listed under that category.

Bordland

The Earldom estate which paid no skatt (tax), derived from rentals (1503-1595).

Industrial

Such as *water mills* and *iron production or working sites*, charcoal kilns and furnaces.

3. **Location** - Details given include a 6 or 8 figure grid reference where possible as well as the island and parish.

4. **Aspect** - A site was considered coastal if it lay within 100m of the sea. Nowhere in Orkney is more than 5 km away from the sea. A more precise impression of the significance of a site's location is given in the **nearest landing place** field. The direction a site faces refers to the landing place.

5. **Nearest landing place** - The distance in metres from the nearest convenient landing place for a small boat (based on 18th C Admiralty charts). The landing place may be lochside, riverine or coastal provided there is adequate access to the sea. The value 0 indicates an eroded coast where it was not possible to deduce the original distance of the site from the nearest landing place. Where the coast has accreted since the Medieval period an estimate of the original distance of the site from the shore is given.

6. **Date** - The following system (after Lowe, 1987) was used:

Late Iron Age	C5 - 9
Viking	C9 - 11
Late Norse	C12 - 15
Early Medieval	C5 - 9
Late Medieval	C14 - 15
Post Medieval	C16 - 17
Modern	C18 - 20

Radio-carbon dates appear in tabular form in Appendix 2. Coin dates appear in tabular form in Appendix 3.
The dating material used is cited after the date:- finds, documentary sources, structural typology, stratigraphy, associated structures, or radio-carbon dates.

7. **Phases** - The number and date range of phases ie. occupation and constructional phases and not periods of abandonment or episodes within a single phase. The number of phases cited here may therefore differ from referenced sources due to the individual site recording systems used.

8. **Place-name evidence** - An explanation of an ascribed site name and/or an explanation of the Old Norse meaning of the nearest place name where relevant.

9. **Excavation history** - An account of the site's discovery and investigation thereof.

10. **Description** - Details of the site, inlcuding its extent, so far as is known and a summary of the Medieval structures found.

11. **Finds assemblage** - Details of the finds recovered from the site. *None* was entered where certain categories of material were definitely not found. Details of finds were not completed for group categories such as ***bordland***, where entries occur under sub-categories.

12. **Environmental evidence** - Biological evidence from the site. (Whale) indicates the presence of whalebone artefacts. Component species (of fish, wood etc.) were cited as space permitted. Further details can be found in chapters 4 and 5.

13. **Status** - The current interpretation of the site or author's interpretation.

14. **Association** - Other gazetteer sites with which this one may be associated.

15. **Survival** - of finds and structures.

16. **Erosion rate** - An estimate of the rate of erosion in metres per year according to the evidence of local inhabitants and other sources (see chapter 3). In the case of sites covering wide areas eg. bordland the erosion rate is for any known stretch of coast within that area. 0 indicates currently stable or accreting coasts, though in some cases this situation is due to the construction of artificial barriers. The survival of such a site might be recorded as "good" at present since it is not immediately under threat, even though the neighbouring coast is eroding. No erosion rate is given for inland sites. Erosion rates of the nearest strecth of coastline are given for sites which lie several metres inland.

17. **References** - Firstly to other gazetteers where a more detailed list of references can be found and secondly to major fieldwork reports and other relevant texts.

18. **SMR/NMR reference** - Reference to the Sites and Monuments Record which is held in Stromness, Orkney. National Monuments Record numbers are given for sites not listed in the SMR. No reference indicates that the site occurred in neither record at the time of writing.

19. **Plan or drawing** - Site plan or photograph (referenced).

Abbreviations used in the text

AOC	Archaeological Operations and Conservation Ltd., Edinburgh.
BM	British Museum
CC	Cursiter Collection
HMG	Hunterian Museum, Glasgow
NMAS	National Museum of Archaeology of Scotland, Queen St., Edinburgh.
OFS	Orkney Field Survey by author May-June 1993. Record sheet number.
OS	Orkneyinga Saga
PM	Post Medieval
PRM	Pitt Rivers Museum
THM	Tankerness House Museum, Kirkwall

Index to sites in gazetteer (by gazetteer number)

No.	*Site name*	*Category*	*SMR/NMR ref.*
001	Pool, Sanday	Settlement	OR290
002	Brough of Birsay, Birsay	Maritime structure	HY22NW1
003	Broch of Lambaness, Sanday	Isolated finds	OR224;338
004	Pool, Sanday	Maritime structure	OR290
005	Scuthi Head, Sanday	Defensive	OR253
006	Howar, Sanday	Isolated find	OR359
007	Strømness, North Ronaldsay	Settlement	OR216
008	Braeswick, Sanday	Burial	OR335
009	Fea Hill, Sanday	Isolated find	HY63NW4
010	Lambaness, Sanday	Burial	OR337
011	Lambaness, Sanday	Burial	OR336
012	Sties of Brough, Sanday	Cemetery	OR324-7
013	Gallow Hill, Sanday	Settlement	OR387
014	Cross Old Kirk, Sanday	Settlement	OR135
015	Laminess, Sanday	Isolated finds	OR446
016	King's Craig, Papa Westray	Settlement	OR789
017	Whitehowe, Papa Westray	Maritime structure	OR790
018	St. Boniface's, Papa Westray	Chapel	OR847
019	St. Tredwell's, Papa Westray	Chapel	OR850
020	Weelie's Taing, Papa Westray	Maritime structure	OR823
021	Tuquoy, Westray	Settlement	OR710
022	Links of Trenabie, Westray	Cemetery	OR856
023	Mae Sand/Tuquoy Links, Westray	Cemetery	OR762
024	Pierowall Links, Westray	Cemetery	OR761
025	Cross Kirk, Westray	Chapel	OR892
026	Lady Kirk, Westray	Chapel	OR913
027	Westness, Rousay	Settlement	OR543
028	Moaness, Rousay	Cemetery	OR549
029	Westness, Rousay	Maritime structure	OR544
030	Swandro, Rousay	Cemetery	OR546-8
031	Westness, Rousay	Burial	OR545
032	The Wirk, Rousay	Defensive	OR486

No.	*Site name*	*Category*	*SMR/NMR ref.*
033	Skaill, Egilsay	Settlement	OR808
034	Eynhallow, Rousay	Monastery	OR551
035	Cubbie Roo's Castle, Wyre	Defensive	OR796
036	Osmundwall, South Walls	Maritime structure	None
037	Dingieshowe, St. Andrews	*Thing*	OR1
038	Quoys, Deerness	Settlement	HY50SE15
039	Skaill, Deerness	Settlement	OR2033
040	Brough of Deerness, Deerness	Settlement	OR1147
041	Castle of Stackel Brae, Eday	Defensive	OR741
042	The Dane's Pier, Stronsay	Maritime structure	OR163
043	St. Magnus's, Egilsay	Chapel	OR807
044	St. Mary's, Wyre	Chapel	OR795
045	Scar, Burness, Sanday	Burial	OR259
046	Broch of Gurness, Evie	Cemetery	OR1183
047	Broch of Gurness, Evie	Settlement	OR1183
048	Elwick Bay, Shapinsay	Maritime structure	None
049	Buckquoy, Birsay	Burials	OR1669
050	Buckquoy, Birsay	Settlement	OR1669
051	Brough of Birsay, Birsay	Settlement	HY22NW1
052	Brough of Birsay, Birsay	Chapel	HY22NW1
053	Brough of Birsay, Birsay	Cemetery	HY22NW1
054	Earl's Bu, Orphir	Settlement	OR1426
055	Round Church, Orphir	Chapel	OR1427
056	S of Red Craig, Birsay	Burials	HY20NE18
057	St. Magnus' Cathedral, Kirkwall	Cathedral	OR1565
058	Saevar Howe, Birsay	Cemetery	OR1663
059	Saevar Howe, Birsay	Settlement	OR1663
060	S of Red Craig, Birsay	Settlement	HY22NW16
061	Sandside, Graemsay	Burial	HY20NE28
062	Northtown Moss, Burray	Hoard	OR1785
063	Skaill, Sandwick	Hoard	OR1248
064	Caldale, Kirkwall	Hoard	OR1566
065	Ring of Brodgar, Stenness	Hoard	OR1356
066	Loch Stenness, Stenness	Hoard	OR1363
067	Lyking, Sandwick	Burial	OR1284

No.	*Site name*	*Category*	*SMR/NMR ref.*
068	Stenness, Stenness	Burial	OR1368
069	Howe of Howe, Stromness	Settlement	OR1495
070	Gyron Hill, Sandwick	Isolated find	OR1243
071	Links of Skaill, Sandwick	Burial	OR1247
072	Finstown, Firth	Burial	HY31SE31
073	Castle Howe, Holm	Defensive	OR81
074	Oxtro Broch, Birsay	Cemetery	OR1675
075	Earl's Palace, Birsay	Isolated find	OR1664
076	Quoybanks, St. Ola	Isolated find	OR1540
077	Stenness, Stenness	Burial	HY31SW4
078	Skaill, Sandwick	Isolated finds	HY21NW13
079	Greenigoe, St. Ola	Burial	OR1410
080	Warebeth Broch, Stromness	Cemetery	OR1461
081	Lavacroon, Orphir	Industrial	HY30SW4
082	?, Sanday	Industrial	OR 392
083	St. Peter's Kirk, Evie	Chapel	OR650
084	St. Thomas's, North Aittit, Rendall	Chapel	OR1765
085	Broch of Burgar, Evie	Burials	OR639
086	Beachview Studio, Birsay	Settlement	HY22NW19
087	Reeky Knowes, Aikerness, Evie	Maritime structure	OR1187
088	Tingwall, Evie	*Thing*	OR711
089	St. Ola, Kirkwall	Chapel	OR1543
090	Linton Chapel, Shapinsay	Chapel	OR1055
091	Damsay, Firth	Defensive	HY31SE25
092	Camp of Jupiter Fring, Rousay	*Thing*	OR 552; 604
093	Red Craig, Birsay	Settlement	HY22NW15
094	Deerness Parish church	Chapel	HY50NE13
095	Newark, Deerness	Chapel	OR1176
096	Newark, Deerness	Cemetery	OR1176
097	Corn Holm, Copinsay	Chapel	OR1897
098	Corn Holm, Copinsay	Monastery	OR1897
099	Earl's Bu, Orphir	Industrial	HY30SW15
100	Nether Bigging, Stenness	Defensive	OR1391
101	Maeshowe, Stenness	Runes	HY31SW1
102	Brodgar Farm, Stenness	Rune	OR1367

No.	*Site name*	*Category*	*SMR/NMR ref.*
103	Loch Stenness, Stenness	Rune	OR1315
104	Broch of Stackrue, Sandwick	Rune	OR1270
105	Lower Dishes, Stronsay	Settlement	OR157
106	Cobbie Roo's Lade, Stronsay	Maritime structure	OR127
107	Ellibister, Rendall	Defensive	HY32SE11
108	Sealskerry Bay, Eday	Defensive	OR736
109	Muckle Green Holm, Eday	Settlement	OR928
110	St. Mary's, Skaill, Eday	Chapel	OR985
111	Peterkirk, Rapness, Westray	Chapel	OR724
112	Peatworth, Stronsay	Maritime structure	None
113	Ring of Brodgar, Stenness	Rune	OR1357
114	Bu of Burray	Bordland	None
115	Burwick, S. Ronaldsay	Bordland	None
116	Bu of Hoy	Bordland	None
117	Bu of Orphir	Bordland	OR1426-7
118	Kirkwall	Bordland	None
119	Nether Lyking, Sandwick	Bordland	None
120	Swartmeill, Westray	Bordland	None
121	Wasbuster, Westray	Bordland	None
122	Bu of Rapness, Westray	Bordland	OR724
123	Gryndleith, Sanday	Bordland	None
124	Bus of Brough, Sanday	Bordland	OR321; 325-6
125	Halkiness, Sanday	Bordland	None
126	Tofts, Sanday	Bordland	OR247
127	Tresness, Sanday	Bordland	OR149
128	Walls, Sanday	Bordland	None
129	Lopness, Sanday	Bordland	OR285
130	Holland, Stronsay	Bordland	None
131	Clestrain, Stronsay	Bordland	OR1012
132	Musbuster, Stronsay	Bordland	None
133	Papa Stronsay	Bordland	OR175
134	Tam's Castle, Stronsay	Monastery	OR132
135	St. Magnus', Birsay	Chapel	OR1666
136	Kirkwall	Settlement / *thing*	HY41SW43
137	Bishop's Palace, Kirkwall	Bishop's Palace	OR1563

No.	*Site name*	*Category*	*SMR/NMR ref.*
138	Snusgar, Sandwick	Defensive	OR1255
139	Colliness, Sanday	Chapel	OR110
140	Colliness, Sanday	Cemetery	OR111
141	Sandside, Deerness	Settlement	HY50NE34
142	Sebay, St. Andrews	Settlement	OR65
143	The Ward, Deerness	Maritime structure	OR1158
144	Brough of Deerness	Chapel	OR1147
145	Brough of Deerness	Cemetery	OR1147
146	Costa Hill, Birsay	Maritime structure	OR1577
147	Saviskaill, Rousay	Settlement	OR480
148	Bú of Papil, Holm	Bordland	OR82
149	Bu of Cairston, Stromness	Defensive	OR1466
150	Bu of Hoy, Hoy	Settlement	OR1915
151	Bay of Creekland, Hoy	*Industrial*	*None*
152	Bu Farm & Swanbister, Orphir	Isolated finds	None
153	Bay of Skaill, Sandwick	Settlement	HY21NW30
154	Bay of Kirbist, Westray	Settlement	OR722
155	The Castle, Marwick	Defensive	OR1710
156	Stenness Kirk, Stenness	Defensive	OR1376
157	Kirkwall	Maritime structure	HY41SW23
158	Rendall	Isolated find	None
159	St. Andrews	Isolated find	OR19
160	Howe Geo, Deerness	Settlement	OR1141
161	Marwick, Birsay	Chapel	OR1709
162	Auskerry, Stronsay	Monastery	OR930
163	Castle of Burwick, S. Ronaldsay	Monastery	OR1872
164	Muckle Skerry, Pentland Firth	Monastery	OR496
165	Houseby, Birsay	Chapel	OR1718
166	Lyking, Sandwick	Chapel	OR1271
167	Marykirk, Harray	Chapel	OR1599
168	Tuquoy, Westray	Maritime structure	OR710
169	Kirkwall	Maritime structure	OR1552
170	Westside Church, Rousay	Chapel	OR487
171	King's Castle, Kirkwall	Defensive	OR1557
172	Bu of Cairston, Stromness	Bordland	OR1466

No.	*Site name*	*Category*	*SMR/NMR ref.*
173	Walls, South Walls	Bordland	None
174	Langskaill, Sanday	Settlement	OR386
175	Brettaness, Rousay	Settlement	OR468
176	Kirkwall	Isolated find	HY41SW23
177	Lea Shun, Stronsay	Isolated find	OR436
178	Marwick, Birsay	Settlement	HY22SW30
179	Old Manse, Westray	Cemetery	OR763
180	Skaill, Westray	Cemetery	OR686
181	Lyking, Holm	Burial	HY50SW17
182	Runthall, Stronsay	Settlement	None
183	Burray	Isolated find	ND49NE4
184	Langskaill, Gairsay	*Settlement*	*HY42SW7*

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Site name	*Category*	*SMR/NMR ref.*	*No.*
?, Sanday	Industrial	OR 392	082
Auskerry, Stronsay	Monastery	OR930	162
Bay of Creekland, Hoy	Industrial	None	151
Bay of Kirbist, Westray	Settlement	OR722	154
Bay of Skaill, Sandwick	Settlement	HY21NW30	153
Beachview Studio, Birsay	Settlement	HY22NW19	086
Bishop's Palace, Kirkwall	Bishop's Palace	OR1563	137
Braeswick, Sanday	Burial	OR335	008
Brettaness, Rousay	Settlement	OR468	175
Broch of Burgar, Evie	Burials	OR639	085
Broch of Gurness, Evie	Cemetery	OR1183	046
Broch of Gurness, Evie	Settlement	OR1183	047
Broch of Lambaness, Sanday	Isolated finds	OR224;338	003
Broch of Stackrue, Sandwick	Rune	OR1270	104
Brodgar Farm, Stenness	Rune	OR1367	102
Brough of Birsay, Birsay	Cemetery	HY22NW1	053
Brough of Birsay, Birsay	Chapel	HY22NW1	052
Brough of Birsay, Birsay	Maritime structure	HY22NW1	002
Brough of Birsay, Birsay	Settlement	HY22NW1	051
Brough of Deerness	Cemetery	OR1147	145
Brough of Deerness	Chapel	OR1147	144
Brough of Deerness, Deerness	Settlement	OR1147	040
Bu Farm & Swanbister, Orphir	Isolated finds	None	152
Bu of Burray	Bordland	None	114
Bu of Cairston, Stromness	Bordland	OR1466	172
Bu of Cairston, Stromness	Defensive	OR1466	149
Bu of Hoy	Bordland	None	116
Bu of Hoy, Hoy	Settlement	OR1915	150
Bú of Papil, Holm	Bordland	OR82	148
Bu of Rapness, Westray	Bordland	OR724	122
Bu or Orphir	Bordland	OR1426-7	117
Buckquoy, Birsay	Burials	OR1669	049

Site name	*Category*	*SMR/NMR ref.*	*No.*
Buckquoy, Birsay	Settlement	OR1669	050
Burray	Isolated find	ND49NE4	183
Burwick, S. Ronaldsay	Bordland	None	115
Bus of Brough, Sanday	Bordland	OR321; 325-6	124
Caldale, Kirkwall	Hoard	OR1566	064
Camp of Jupiter Fring, Rousay	*Thing*	OR 552; 604	092
Castle Howe, Holm	Defensive	OR81	073
Castle of Burwick, S. Ronaldsay	Monastery	OR1872	163
Castle of Stackel Brae, Eday	Defensive	OR741	041
Clestrain, Stronsay	*Bordland*	*OR1012*	*131*
Cobbie Roo's Lade, Stronsay	Maritime structure	OR127	106
Colliness, Sanday	Cemetery	OR111	140
Colliness, Sanday	Chapel	OR110	139
Corn Holm, Copinsay	Chapel	OR1897	097
Corn Holm, Copinsay	Monastery	OR1897	098
Costa Hill, Birsay	Maritime structure	OR1577	146
Cross Kirk, Westray	Chapel	OR892	025
Cross Old Kirk, Sanday	Settlement	OR135	014
Cubbie Roo's Castle, Wyre	Defensive	OR796	035
Damsay, Firth	Defensive	HY31SE25	091
Deerness Parish church	Chapel	HY50NE13	094
Dingieshowe, St. Andrews	*Thing*	OR1	037
Earl's Bu, Orphir	Industrial	HY30SW15	099
Earl's Bu, Orphir	Settlement	OR1426	054
Earl's Palace, Birsay	Isolated find	OR1664	075
Ellibister, Rendall	Defensive	HY32SE11	107
Elwick Bay, Shapinsay	Maritime structure	None	048
Eynhallow, Rousay	Monastery	OR551	034
Fea Hill, Sanday	Isolated find	HY63NW4	009
Finstown, Firth	Burial	HY31SE31	072
Gallow Hill, Sanday	Settlement	OR387	013
Greenigoe, St. Ola	Burial	OR1410	079
Gryndleith, Sanday	Bordland	None	123
Gyron Hill, Sandwick	Isolated find	OR1243	070
Halkiness, Sanday	Bordland	None	125

Site name	*Category*	*SMR/NMR ref.*	*No.*
Holland, Stronsay	Bordland	None	130
Houseby, Birsay	Chapel	OR1718	165
Howar, Sanday	Isolated find	OR359	006
Howe Geo, Deerness	Settlement	OR1141	160
Howe of Howe, Stromness	Settlement	OR1495	069
King's Craig, Papa Westray	Settlement	OR789	016
King's Castle, Kirkwall	Defensive	OR1557	171
Kirkwall	Bordland	None	118
Kirkwall	Isolated find	HY41SW23	176
Kirkwall	Maritime structure	HY41SW23	157
Kirkwall	Maritime structure	OR1552	169
Kirkwall	Settlement / *thing*	HY41SW43	136
Lady Kirk, Westray	Chapel	OR913	026
Lambaness, Sanday	Burial	OR336	011
Lambaness, Sanday	Burial	OR337	010
Laminess, Sanday	Isolated finds	OR446	015
Langskaill, Gairsay	Settlement	HY42SW7	184
Langskaill, Sanday	Settlement	OR386	174
Lavacroon, Orphir	Industrial	HY30SW4	081
Lea Shun, Stronsay	Isolated find	OR436	177
Links of Skaill, Sandwick	Burial	OR1247	071
Links of Trenabie, Westray	Cemetery	OR856	022
Linton Chapel, Shapinsay	Chapel	OR1055	090
Loch Stenness, Stenness	Hoard	OR1363	066
Loch Stenness, Stenness	Rune	OR1315	103
Lopness, Sanday	Bordland	OR285	129
Lower Dishes, Stronsay	Settlement	OR157	105
Lyking, Holm	Burial	HY50SW17	181
Lyking, Sandwick	Burial	OR1284	067
Lyking, Sandwick	Chapel	OR1271	166
Mae Sand/Tuquoy Links, Westray	Cemetery	OR762	023
Maeshowe, Stenness	Runes	HY31SW1	101
Marwick, Birsay	Chapel	OR1709	161
Marwick, Birsay	Settlement	HY22SW30	178
Marykirk, Harray	Chapel	OR1599	167

Site name	*Category*	*SMR/NMR ref.*	*No.*
Moaness, Rousay	Cemetery	OR549	028
Muckle Green Holm, Eday	Settlement	OR928	109
Muckle Skerry, Pentland Firth	Monastery	OR496	164
Musbuster, Stronsay	Bordland	None	132
Nether Bigging, Stenness	Defensive	OR1391	100
Nether Lyking, Sandwick	Bordland	None	119
Newark, Deerness	Cemetery	OR1176	096
Newark, Deerness	Chapel	OR1176	095
Northtown Moss, Burray	Hoard	OR1785	062
Old Manse, Westray	Cemetery	OR763	179
Osmundwall, South Walls	Maritime Structure	None	036
Oxtro Broch, Birsay	Cemetery	OR1675	074
Papa Stronsay	Bordland	OR175	133
Peatworth, Stronsay	Maritime structure	None	112
Peterkirk, Rapness, Westray	Chapel	OR724	111
Pierowall Links, Westray	Cemetery	OR761	024
Pool, Sanday	Maritime structure	OR290	004
Pool, Sanday	Settlement	OR290	001
Quoybanks, St. Ola	Isolated find	OR1540	076
Quoys, Deerness	Settlement	HY50SE15	038
Red Craig, Birsay	Settlement	HY22NW15	093
Reeky Knowes, Aikerness, Evie	Maritime structure	OR1187	087
Rendall	Isolated find	None	158
Ring of Brodgar, Stenness	Hoard	OR1356	065
Ring of Brodgar, Stenness	Rune	OR1357	113
Round Church, Orphir	Chapel	OR1427	055
Runthall, Stronsay	Settlement	None	182
S of Red Craig, Birsay	Burials	HY20NE18	056
S of Red Craig, Birsay	Settlement	HY22NW16	060
Saevar Howe, Birsay	Cemetery	OR1663	058
Saevar Howe, Birsay	Settlement	OR1663	059
Sandside, Deerness	Settlement	HY50NE34	141
Sandside, Graemsay	Burial	HY20NE28	061
Saviskaill, Rousay	Settlement	OR480	147
Scar, Burness, Sanday	Burial	OR259	045

Site name	*Category*	*SMR/NMR ref.*	*No.*
Scuthi Head, Sanday	Defensive	OR253	005
Sealskerry Bay, Eday	Defensive	OR736	108
Sebay, St. Andrews	Settlement	OR65	142
Skaill, Deerness	Settlement	OR2033	039
Skaill, Egilsay	Settlement	OR808	033
Skaill, Sandwick	Hoard	OR1248	063
Skaill, Sandwick	Isolated finds	HY21NW13	078
Skaill, Westray	Cemetery	OR686	180
Snusgar, Sandwick	Defensive	OR1255	138
St. Andrews	Isolated find	OR19	159
St. Boniface's, Papa Westray	Chapel	OR847	018
St. Magnus' Cathedral, Kirkwall	Cathedral	OR1565	057
St. Magnus', Birsay	Chapel	OR1666	135
St. Magnus's, Egilsay	Chapel	OR807	043
St. Mary's, Skaill, Eday	Chapel	OR985	110
St. Mary's, Wyre	Chapel	OR795	044
St. Ola, Kirkwall	Chapel	OR1543	089
St. Peter's Kirk, Evie	Chapel	OR650	083
St. Thomas's, North Aittit, Rendall	Chapel	OR1765	084
St. Tredwell's, Papa Westray	Chapel	OR850	019
Stenness Kirk, Stenness	Defensive	OR1376	156
Stenness, Stenness	Burial	HY31SW4	077
Stenness, Stenness	Burial	OR1368	068
Sties of Brough, Sanday	Cemetery	OR324-7	012
Strømness, North Ronaldsay	Settlement	OR216	007
Swandro, Rousay	Cemetery	OR546-8	030
Swartmeill, Westray	Bordland	None	120
Tam's Castle, Stronsay	Monastery	OR132	134
The Castle, Marwick	Defensive	OR1710	155
The Dane's Pier, Stronsay	Maritime structure	OR163	042
The Ward, Deerness	Maritime structure	OR1158	143
The Wirk, Rousay	Defensive	OR486	032
Tingwall, Evie	*Thing*	OR711	088
Tofts, Sanday	Bordland	OR247	126
Tresness, Sanday	Bordland	OR149	127

Site name	*Category*	*SMR/NMR ref.*	*No.*
Tuquoy, Westray	Maritime structure	OR710	168
Tuquoy, Westray	Settlement	OR710	021
Walls, Sanday	Bordland	None	128
Walls, South Walls	Bordland	None	173
Warebeth Broch, Stromness	Cemetery	OR1461	080
Wasbuster, Westray	Bordland	None	121
Weelie's Taing, Papa Westray	Maritime structure	OR823	020
Westness, Rousay	Burial	OR545	031
Westness, Rousay	Maritime structure	OR544	029
Westness, Rousay	Settlement	OR543	027
Westside Church, Rousay	Chapel	OR487	170
Whitehowe, Papa Westray	Maritime structure	OR790	017

Gazetteer no. *1*

Site name *Pool*

Category	Settlement	**Island**	Sanday
Location	HY 6194 3785	**Parish**	Cross & Burness
Aspect	Coastal **Facing** N;W	**Nearest landing place**	0
Date	3500BC - C13 Stratigraphy; finds; RC		
Phases	8 Neolithic/ late Iron Age/ 3 Norse		
Place name	None		
Excavation	Recorded Lamb, 1980; Excavated Hunter 1984-8		
Description	Deposits up to 2.5m thick along 60m of coast. I) Longhouse 20m x 4m; II) Byre extended; III) Converted to barn. I) Domestic building 20m x II) replaced by shortened longhouse		

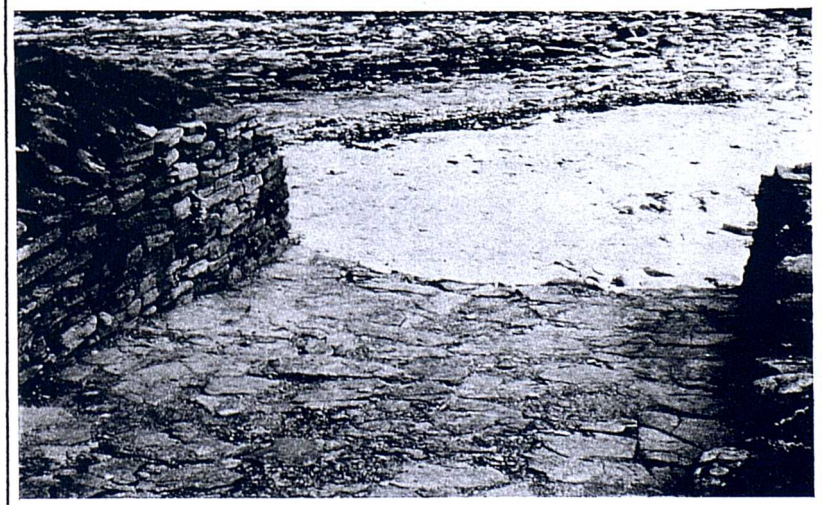
Pottery	C12 & C13 Dutch wares; grass tempered local pottery
Bone obj	Strap ends; pins; combs
Steatite	60kg or 400 vessel fragments; bakestones; weights
Iron	
Copper	Cu alloy brooch and other items
Clay	Loomweights; mould for ring-headed pin
Stone	Loomweights; pumice
Other	70kg smithing slags
Plant	Barley; flax; bere; oats; seaweed; heather; crowberry
Bone	Strap ends; pins; combs
Other	Peat core from storm beach
Status	Huseby farm
Association	3,4
Survival	Plough damage; sea erosion **Erosion rate** 1
Refs.	Lamb, 1980, no. 84; RCAMS, 1946, no. 2 Hunter, 1985-88; Hunter & Dockrill, 1982; report due
NMR/SMR	OR 290 **Figure** Hunter (unpublished)

Gazetteer no. *2*

Site name *Brough of Birsay*

Category	Maritime structure	**Island**	Mainland
Location	HY 240 285	**Parish**	Birsay
Aspect	Coastal **Facing** W	**Nearest landing place**	0
Date	C8 - C15 Association		
Phases			
Place name	ON Byrgisherad = fort in Harray		
Excavation	Radford, 1950s.		
Description	Over 10m long and 4m wide A paved and revetted ramp, now abruptly eroded. It leads up by the south side of the structures on the Brough of Birsay.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	"broken objects"
Plant	
Bone	
Other	Peat ash
Status	Boat slip; roadway; whale butchery slip
Association	51,52,53
Survival	Sea erosion **Erosion rate** 1
Refs.	Hunter & Morris, 1981
NMR/SMR	NMR HY22NW1 **Figure** (Crawford, 1987)

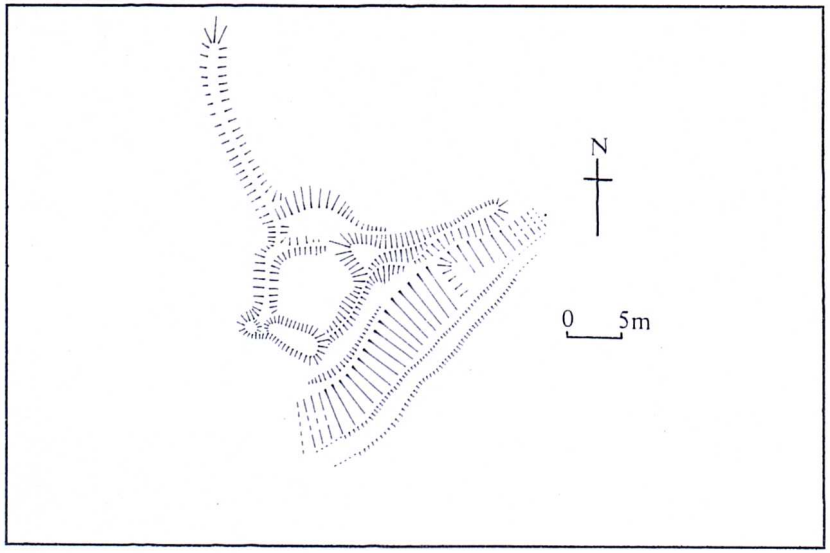


Gazetteer no. *3*

Site name *Lambaness Broch*

Category Isolated finds **Island** Sanday
Location HY 61 37 **Parish** Cross & Burness
Aspect Coastal **Facing** N;W **Nearest landing place** 10
Date C5 - C11 Finds
Phases
Place name ON ?Lamines = lamb headland.
Excavation Finds donated by Col. Balfour in 1878.
Description Earthwork covers an area c. 40m x 30m.
Described only as "an ancient structure".

Pottery None
Bone obj Comb; 2 pins; handles
Steatite None
Iron None
Copper Bronze pin; bronze bodkin
Clay None
Stone 3 quernstones; sandstone vessel
Other Antler implement
Plant None
Bone Comb; 2 pins; handles
Other None
Status Male and female burial
Association 8,10,11
Survival Finds: NMAS; Earthworks in situ. **Erosion rate**
Refs. Lamb, R.G., 1980, no. 61.
Hunter & Dockrill, 1982
NMR/SMR OR 338; OR 244 **Figure** (Hunter & Dockrill, 1982)



Gazetteer no. *4*

Site name *Pool Bay*

Category Maritime structure **Island** Sanday
Location HY 619 376 **Parish** Cross & Burness
Aspect Coastal **Facing** N;W **Nearest landing place** 0
Date C10 -C13 Local tradition
Phases
Place name None
Excavation None
Description c. 25m N-S by 25m W-E.
Possible artificial enhancement of a natural taing to form a harbour.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Harbour for *Huseby farm*
Association 1
Survival Good **Erosion rate** *1*
Refs. Hunter & Dockrill, 1982, 570; Lamb, 1984, 8.
NMR/SMR OR 290 **Figure** (Author)

Gazetteer no. 5

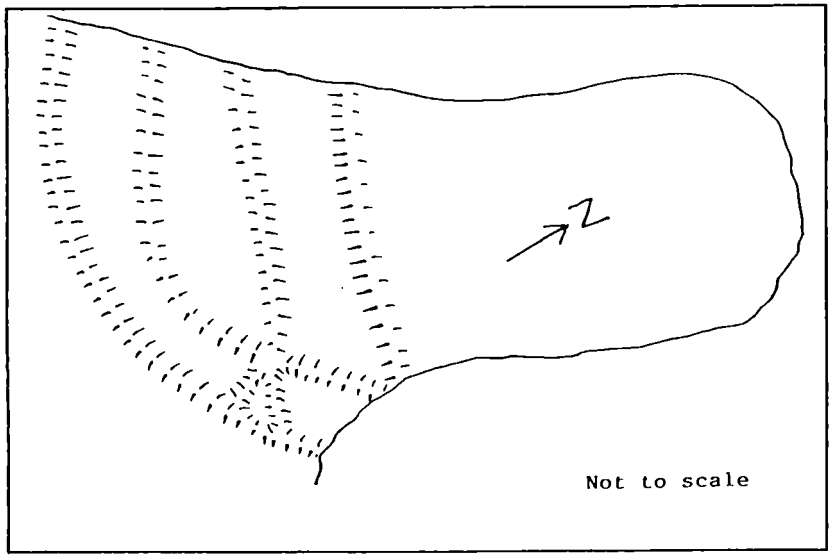
Site name *Scuthi Head*

Category	Defensive	Island	Sanday
Location	HY 6330 4007	Parish	Cross & Burness
Aspect	Coastal Facing N;W	Nearest landing place	1000
Date			
Phases			
Place name	None		
Excavation	None		
Description	c. 10m by 10m. 4 earth banks up to 0.8m high across the isthmus.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	
Association	
Survival	Good
Refs.	Lamb, R.G., 1980, no. 57

Erosion rate 0

NMR/SMR OR 253 Figure (SMR)



Gazetteer no. 6

Site name *Howar*

Category	Isolated find	Island	Sanday
Location	HY 6171 3718	Parish	Cross & Burness
Aspect	Inland Facing	Nearest landing place	500
Date	C5 - C9 or C9 - Finds		
Phases			
Place name	None		
Excavation	Recorded by Grieg, 1940.		
Description	Kitchen midden; a mound 50ft diameter at North Howar may be the origin of the midden material. OS recorded no surface traces in 1970.		

Pottery	
Bone obj	
Steatite	4 vessel frgs; one perforated, type unknown.
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	Shellfish
Status	Settlement, possibly Medieval
Association	
Survival	Not stated in SMR.
Refs.	Lamb, 1980, no. 77; Grieg, 1940, 150

Erosion rate 0

NMR/SMR OR 359 Figure

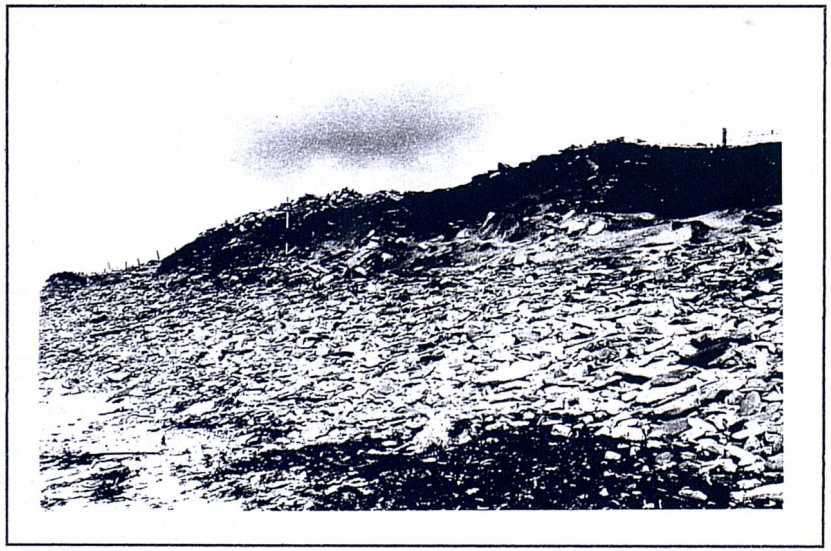
Gazetteer no. *7*

Site name *Strömness*

Category Settlement **Island** North Ronaldsay
Location HY 7610 5130 **Parish** North Ronaldsay
Aspect Coastal **Facing** S **Nearest landing place** 100
Date C5 - C11 Finds
Phases
Place name ON strömnes = headland of the current.
Excavation
Description Settlement mound 100m x 50m.
Walls and midden material visible eroding over a distance of 40m. One grave excavated, a second is
The walls are constructed of turf and stone.

Pottery
Bone obj Composite comb; needle
Steatite
Iron
Copper Bronze pennanular brooch (grave)
Clay
Stone Unspecified object
Other Whorl of vitreous material
Plant
Bone Composite comb; needle
Other Limpet shells
Status
Association Broch of Burrian
Survival Sea erosion **Erosion rate**
Refs. Lamb, 1980, no. 114

NMR/SMR OR 216 **Figure** (Author)



Gazetteer no. *8*

Site name *Braeswick*

Category Burial **Island** Sanday
Location HY 61 37 **Parish** Cross & Burness
Aspect **Facing** **Nearest landing place**
Date C10 - C13 Finds
Phases
Place name ON vík = bay
Excavation An investigation early this century.
Description
A narrow subterranean passage.

Pottery
Bone obj
Steatite Rude stone vessels, probably steatite recorded.
Iron
Copper Bronze tortoise brooch, type Rygh 648.
Clay
Stone
Other Amber bead; white glass bead
Plant
Bone
Other The finds were wrapped in seal or otter skin.
Status Female burial
Association 10,11
Survival Finds: NMAS; No structure visible **Erosion rate**
Refs. RCAMS, 1946, no. 192; Lamb, 1980, no. 129
Grieg, 1940, 88 & fig. 50
NMR/SMR OR 335 **Figure**

Gazetteer no. *9*

Site name *Fea Hill*

Category Isolated find
Location HY 641 401
Aspect Inland Facing
Date C10 - C13 Finds
Phases
Place name None
Excavation Recorded by Grieg, 1940
Description
Kitchen midden

Island Sanday
Parish Cross & Burness
Nearest landing place 900

Pottery
Bone obj Comb, Rygh type 447
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone Comb, Rygh type 447
Other Shellfish
Status Settlement site
Association
Survival
Refs. Grieg, 1940, 150

Erosion rate

NMR/SMR NMR HY63NW4 Figure

Gazetteer no. *10*

Site name *Lambaness*

Category Burial
Location HY 61 37
Aspect Facing
Date C10 Finds
Phases
Place name ON ? lamines = lamb headland.
Excavation Found in 1878 during construction work.
Description
A grave?

Island Sanday
Parish Cross & Burness
Nearest landing place

Pottery None
Bone obj None
Steatite None
Iron Sword; spearhead; axehead
Copper None
Clay None
Stone None
Other None
Plant None
Bone None
Other None
Status Male burial
Association 3,8,11
Survival Finds: NMAS
Refs. Lamb, 1980, no. 130; RCAMS, 1946, no. 1
Shetelig, 1954, 70; Wainwright, 1962, 148

Erosion rate

NMR/SMR OR 337 Figure

Gazetteer no. *11*

Site name *Lambaness*

Category Burial — Island Sanday
Location HY 61 37 — Parish Cross & Burness
Aspect — Facing — Nearest landing place
Date C10 — Finds
Phases
Place name ON ? lamines = lamb headland
Excavation Discovered early this century.
Description
A grave.

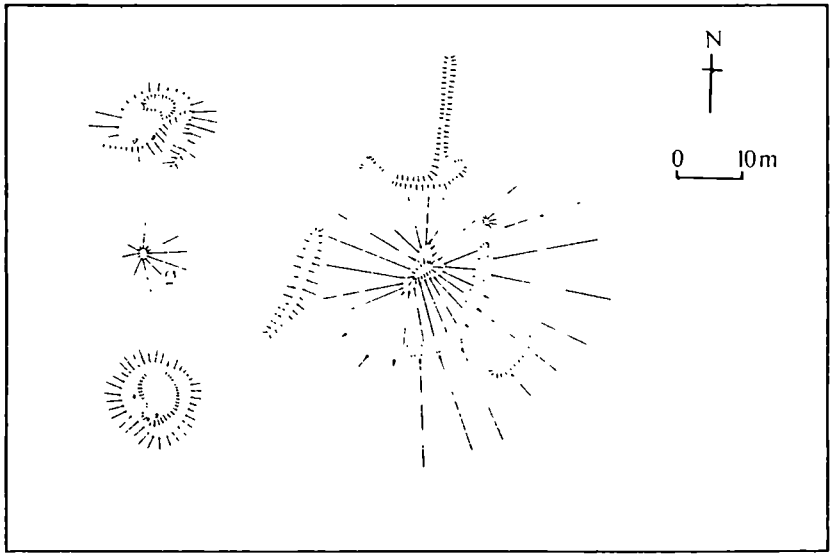
Pottery None
Bone obj None
Steatite None
Iron None
Copper Two bronze tortoise brooches; bronze penannular brooc
Clay None
Stone None
Other Jet armlet; amber bead
Plant None
Bone None
Other None
Status Female burial
Association 3,8,10
Survival Finds: NMAS — Erosion rate
Refs. Lamb, 1980, no. 131; RCAMS, 1946, No. 191
Curle et al, 1954, 70; Wainwright, 1962, 148
NMR/SMR OR 336 — Figure

Gazetteer no. *12*

Site name *Sties of Brough*

Category Cemetery — Island Sanday
Location HY 654 421 — Parish Cross & Burness
Aspect Coastal — Facing NW — Nearest landing place 5
Date C9 -C11 — Finds
Phases
Place name
Excavation
Description c. 100m by 100m
Four widely spaced (burial?) mounds are the likely findspot of the Viking objects listed
Sword may be from Elsness/Tresness beach, Lady

Pottery None
Bone obj None
Steatite None
Iron Cauldron; sword; axe
Copper None
Clay None
Stone None
Other None
Plant None
Bone None
Other None
Status High status burials
Association 124
Survival Finds: Cursiter Collection, The — Erosion rate
Refs. Lamb, 1980, nos. 132, 248, 249, 251; RCAMS, 1946, no. 148; Hunter & Dockrill, 1982
NMR/SMR OR 324; OR 325; Figure (Hunter & Dockrill, 1982)



Gazetteer no. *13*

Site name *Gallow Hill*

Category Settlement **Island** Sanday
Location HY 6615 4065 **Parish** Cross & Burness
Aspect Inland **Facing** **Nearest landing place** 2000
Date C5 - C9 or C9 - Finds
Phases
Place name
Excavation RCAMS visit 1928
Description

Two slight mounds in which pottery and steatite vessels were found. One mound is enclosed by a 14m in diameter, the other is 12m in diameter and

Pottery Present (urns)
Bone obj
Steatite Present (urn)
Iron
Copper
Clay
Stone Object recorded
Other
Plant
Bone
Other
Status Settlement
Association
Survival **Erosion rate** 0
Refs. Lamb, 1980, no. 142; RCAMS, 1946, no. 189

NMR/SMR OR 387 **Figure**

Gazetteer no. *14*

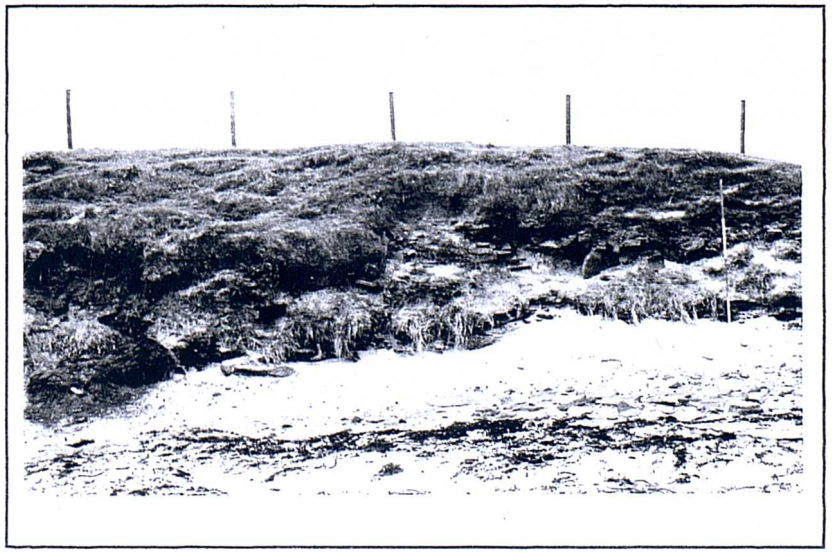
Site name *Cross Old Kirk*

Category Settlement **Island** Sanday
Location HY 6537 3920 **Parish** Cross & Burness
Aspect Coastal **Facing** S **Nearest landing place** 0
Date C10 - C17 Typ; finds
Phases
Place name Presumably a dedication to Holy Cross.
Excavation None
Description

A ruined C17th church on old foundations. Beneath churchyard wall, on west, earthworks, masonry and midden material are visible.

Pottery One body sherd of coarse material
Bone obj None
Steatite One vessel coarse sherd
Iron None
Copper None
Clay None
Stone None
Other Lime render
Plant None
Bone None
Other Shellfish
Status High status with chapel and cemetery.
Association
Survival Sea erosion **Erosion rate** 1
Refs. Lamb, 1980, no. 174; RCAMS, 1946, nos. 174, 175 & OFS no. 30

NMR/SMR OR 135 **Figure** (Author)



Gazetteer no. *15*

Site name *Laminess*

Category Isolated finds **Island** Sanday
Location HY 615 375 **Parish** Cross & Burness
Aspect Inland **Facing** **Nearest landing place** 150
Date C9 - C11 Finds
Phases
Place name ON ? lamines = lamb headland
Excavation None; objects found by the Sinclair family.
Description

Pottery None
Bone obj Whorl
Steatite Fragments of urn and a sinker
Iron None
Copper None
Clay None
Stone Two sinkers, pounder, two whetstones, sandstone tool
Other None
Plant None
Bone Whorl
Other None
Status Settlement site
Association 3?,10,11
Survival Finds: THM **Erosion rate**
Refs. Lamb, 1980, no. 237

NMR/SMR OR 446 **Figure**

Gazetteer no. *16*

Site name *King's Craig*

Category Settlement **Island** Papa Westray
Location HY 4840 5062 **Parish** Papa Westray
Aspect Coastal **Facing** W **Nearest landing place** 0
Date C5 - C9 / C9 - Finds
Phases
Place name No local explanation.
Excavation None; field report only
Description Deposits 2.3m thick along 26m of coast. Drystone structures, including flag stone floors with slab-formed drains beneath them. On clifftop the site is visible as a slight broad

Pottery Present
Bone obj Present
Steatite
Iron
Copper
Clay
Stone Water-worn pumice
Other
Plant
Bone Present
Other Shellfish
Status Settlement site
Association 17
Survival Sea erosion **Erosion rate** *1*
Refs. Lamb, 1983, no. 16; RCAMS, 1946, no. 525; Marwick, 1925, 40

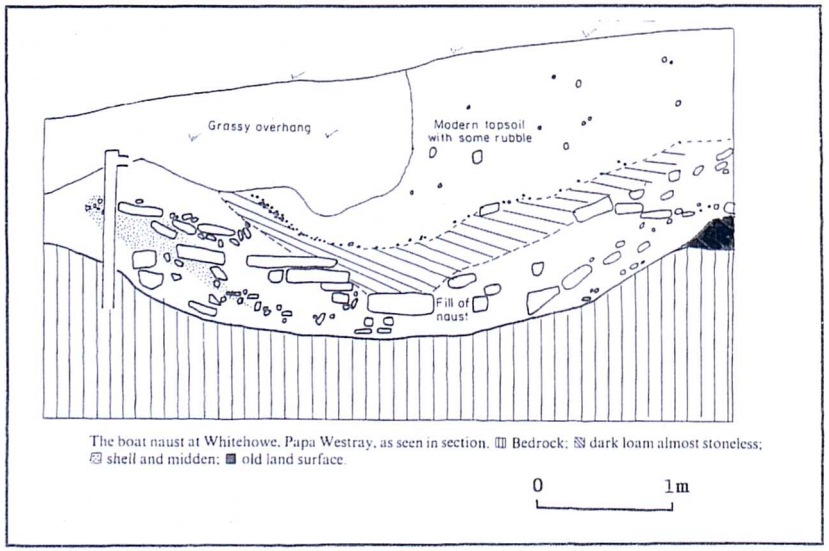
NMR/SMR OR 789 **Figure** (Author)

Gazetteer no. *17*

Site name *Whitehowe*

Category	Maritime structure	**Island**	Papa Westray
Location	HY 4840 5060	**Parish**	Papa Westray
Aspect	Coastal **Facing** W	**Nearest landing place**	0
Date	C9 - C11 Analogy		
Phases			
Place name			
Excavation	None; field report only.		
Description	A basin 4 m wide, 1.1m deep, 0.9m above the beach A naust seen in cross-section, filled with earth and stones.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	Shellfish
Status	Boat naust
Association	16
Survival	Sea erosion **Erosion rate** 0.5
Refs.	Lamb, 1983, no. 46; Bowman, 1990
NMR/SMR	OR 790 **Figure** (Author)



The boat naust at Whitehowe, Papa Westray, as seen in section. ▥ Bedrock; ▨ dark loam almost stoneless; ▩ shell and midden; ■ old land surface.

Gazetteer no. *18*

Site name *St. Boniface*

Category	Chapel	**Island**	Papa Westray
Location	HY 488 526	**Parish**	Papa Westray
Aspect	Coastal **Facing** W	**Nearest landing place**	0
Date	C5 - C20 Typ; finds		
Phases			
Place name	ON boenhus = chapel		
Excavation	Not excavated. Upstanding remains.		
Description	1 ha Iron Age or Pictish settlement, continuing into early Norse times. Bicameral church from C12th. has been demolished; nave was extended in 1700.		

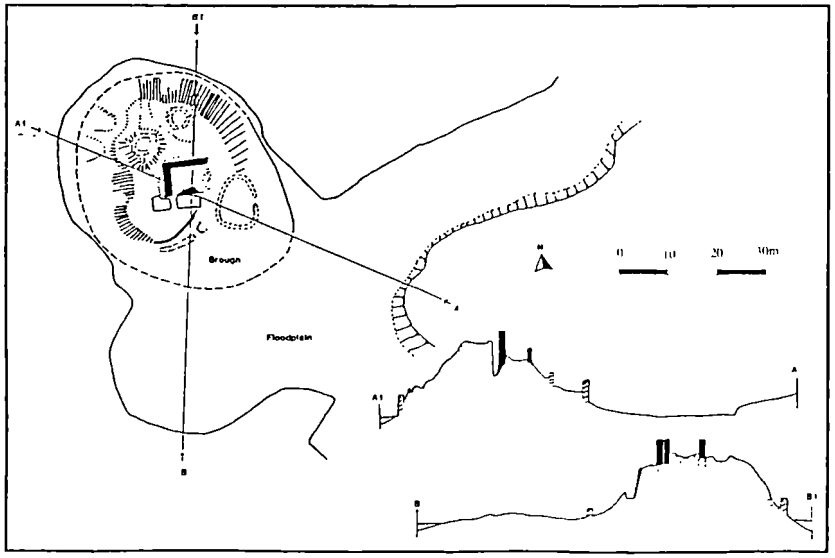
Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	C12 Hogback tombstone and a cross-slab
Other	
Plant	
Bone	
Other	
Status	Monastic in origin?
Association	
Survival	Sea erosion; fabric decaying; **Erosion rate** 1
Refs.	Lamb, 1983, no. 29; RCAMS, 1946, nos. 518-20;
NMR/SMR	OR 847 **Figure** (Author)

Gazetteer no. *19*

Site name *St. Tredwell*

Category	Chapel	Island	Papa Westray
Location	HY 4964 5088	Parish	Papa Westray
Aspect	Loch Facing	Nearest landing place	0
Date	C5 - C18 Typ; finds		
Phases	5+ IA broch/blockhouse; LIA structures; M		
Place name	ON for St. Triduana		
Excavation	C19th by Traill; Drawn by Dryden C19th		
Description	Peninsula, originally an islet, 50m across. IA broch/blockhouse; chapel; midden; cellular buildings; grave; sheep pen; subterranean passage		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	Cross-slab seen in water adjacent
Other	C17th coins
Plant	
Bone	
Other	
Status	
Association	
Survival	Good Erosion rate 0
Refs.	Lamb, 1983, no. 3; RCAMS, 1946, no. 521; Bowman, 1991
NMR/SMR	OR 850 Figure (Author)



Gazetteer no. *20*

Site name *Weelie's Taing*

Category	Maritime structure	Island	Papa Westray
Location	HY 505 533	Parish	Papa Westray
Aspect	Coastal Facing NE	Nearest landing place	0
Date			
Phases			
Place name			
Excavation	None		
Description	Boulder spit Three groups of structures, walls forming a roadway and a circular (sheep?) pund.		

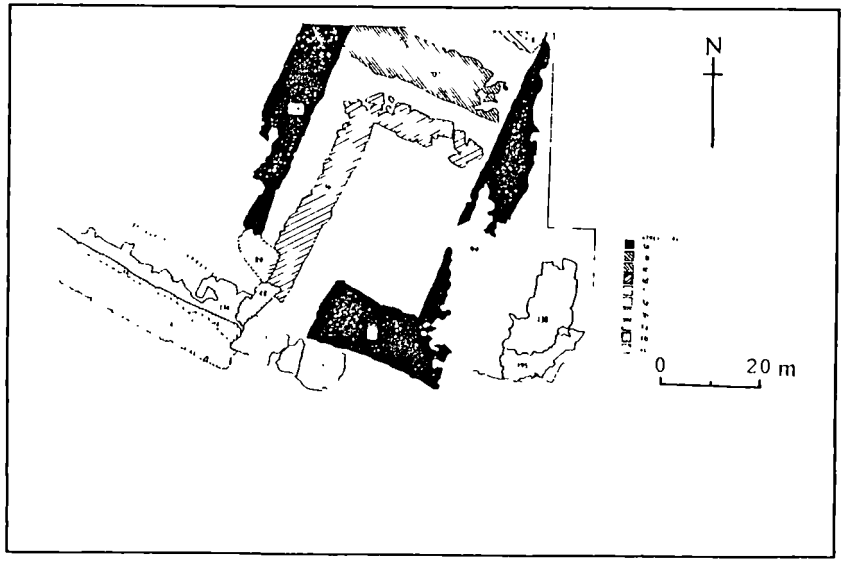
Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	Harbourwork; fish trap
Association	
Survival	Good Erosion rate 0
Refs.	Lamb, 1983, no. 53
NMR/SMR	OR 823 Figure

Gazetteer no. *21*

Site name *Tuquoy*

Category	Settlement	Island	Westray
Location	HY 4543 4313	Parish	Westray
Aspect	Coastal Facing SW	Nearest landing place	0
Date	C10 - C15 Finds;RC; typ; documentary		
Phases	5 Early - late Norse		
Place name	Originally Midbea?		
Excavation	Owen 1982/3; 1988; 1993		
Description	150m along coast; 50m inland. Complex series of structures of different phases: flagged floors, slab-lined drains and midden. identified include a hall, smithy and waterlogged		

Pottery	Hand thrown, locally made pot; imported medieval pot
Bone obj	Combs; toggles; whorls; awl; needle; pins
Steatite	70 + vessel frgs; bakestone; whorl
Iron	Chain; nails; other objects; pot handles; rivets
Copper	Bronze ring-headed pin; mount, plate; wire
Clay	None
Stone	Whetstone; chalk whorl; fishing weights; rune; flint
Other	Lime mortar; wooden artefacts; lead ore; leather
Plant	Pollen core from loch; peat ash; wood; seaweed
Bone	Combs; toggles; whorls; awl; needle; pins
Other	Insects; spiders parasites etc.
Status	Hall of Halfdi
Association	23,25;168
Survival	Sea erosion Erosion rate 2
Refs.	Lamb, 1983, no. 124; Owen, 1983; 1984; 1988; Owen & Mckinnell, 1989
NMR/SMR	OR 710 Figure (Owen, 1984)



Gazetteer no. *22*

Site name *Links of Trenabie*

Category	Cemetery	Island	Westray
Location	HY 44 50	Parish	Westray
Aspect	Coastal Facing W	Nearest landing place	60
Date	C9 - C11 Finds		
Phases			
Place name			
Excavation	C17th description by Wallace; C18th finds by Low		
Description	Three groups of Viking graves. Both tumuli and flat graves. No exact details.		

Pottery	
Bone obj	Combs
Steatite	
Iron	Swords; axes; knives
Copper	Brooches
Clay	
Stone	
Other	Beads; chains; metal spoon; glass cup; gold ring
Plant	
Bone	Combs
Other	
Status	
Association	24,26
Survival	Erosion rate
Refs.	Lamb, 1983, no 129; RCAMS, 1946, no. 1046
NMR/SMR	OR 856 Figure

Gazetteer no. *23*

Site name *Mae Sand/Tuquoy*

Category	Cemetery	Island	Westray
Location	HY 45 43	Parish	Westray
Aspect	Coastal Facing S;W	Nearest landing place	90
Date	C9 - C11 Typ		
Phases			
Place name			
Excavation	C19th account		
Description	Described as two remarkable graves.		

Pottery	
Bone obj	
Steatite	
Iron	Weapons
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	
Association	21,25,168
Survival	Erosion rate
Refs.	Lamb, 1983, no. 130; RCAMS, 1946, no. 1046
NMR/SMR	OR 762 Figure

Gazetteer no. *24*

Site name *Pierowall Links*

Category	Cemetery	Island	Westray
Location	HY 43 49	Parish	Westray
Aspect	Coastal Facing N	Nearest landing place	90
Date	C8 - C9 Typ		
Phases			
Place name			
Excavation	C19th discoveries; reassessed by Thorsteinsson		
Description	17 grave groups		

Pottery	
Bone obj	Whalebone plaque; combs
Steatite	
Iron	Weapons; weaving sword
Copper	Two Celtic brooches; bronze basin; mounts
Clay	
Stone	
Other	Gilt bronze plaque; tortoise brooch
Plant	
Bone	Whalebone plaque; combs
Other	
Status	
Association	22,26
Survival	Finds: NMAS; Sheffield; PRM Erosion rate
Refs.	Lamb, 1983, no. 131; RCAMS, 1946, no. 1045; Thorsteinsson, 1968
NMR/SMR	OR 761 Figure

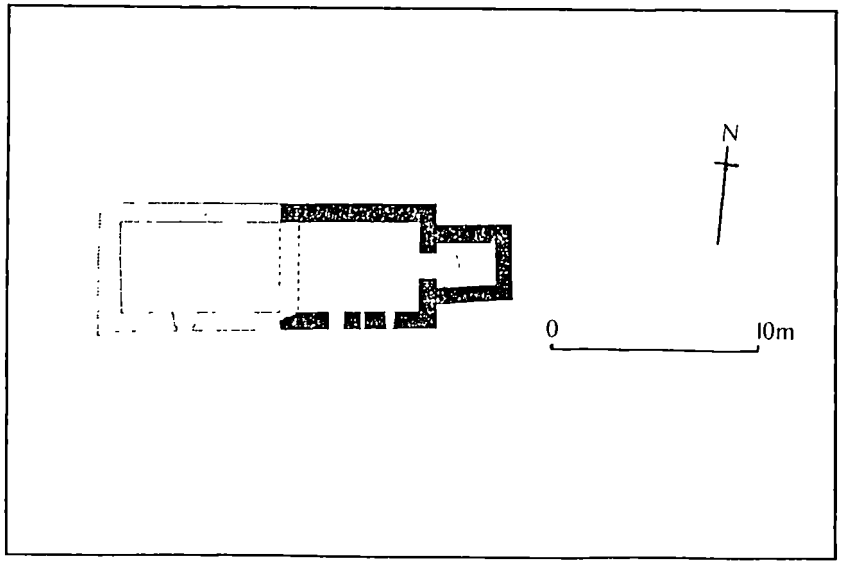
Gazetteer no. *25*

Site name *Cross Kirk*

Category Chapel
Location HY 4550 4315 Island Westray
Aspect Coastal Facing S Parish Westray
Date C12 - C17 Nearest landing place 5
Phases 2+ Typology
Place name
Excavation None
Description

Original chancel and nave were 8m long. This was later extended to 14m. The early walls survive to height of 3m. Rubble masonry & lime mortar.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other Lime mortar
Plant
Bone
Other
Status
Association 21,23,168
Survival Good Erosion rate 2
Refs. Lamb, 1983, no. 148; RCAMS, 1946, no. 1032
OFS no. 8
NMR/SMR OR 892 Figure (RCAMS, 1946)



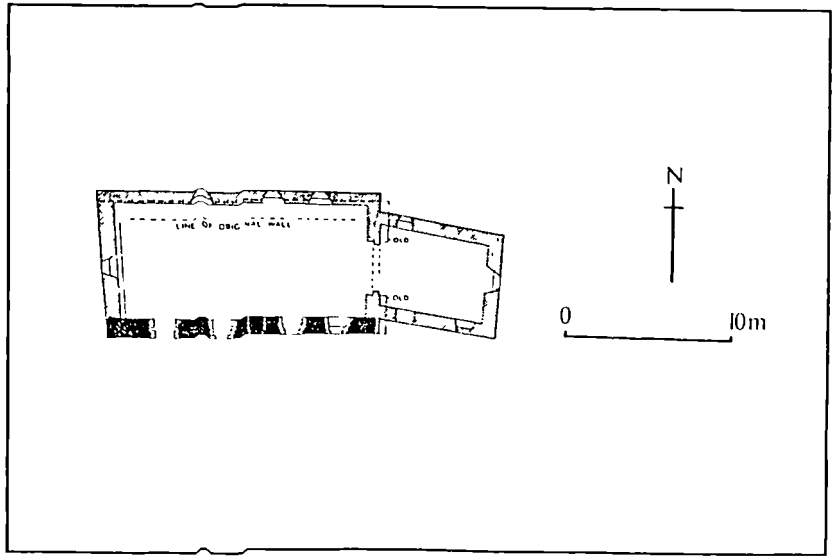
Gazetteer no. *26*

Site name *Ladykirk*

Category Chapel
Location HY 4395 4881 Island Westray
Aspect Coastal Facing E Parish Westray
Date C13 - C17 Nearest landing place 5
Phases 3+ Typ; documentary
Place name
Excavation None
Description

Bicameral church. The original church may have consisted of a nave 14.5m long and 5.8m wide, with chancel at the E end.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 22,24
Survival Good Erosion rate
Refs. Lamb, 1983, no. 150; RCAMS, 1946, no. 1030
NMR/SMR OR 913 Figure (RCAMS, 1946)

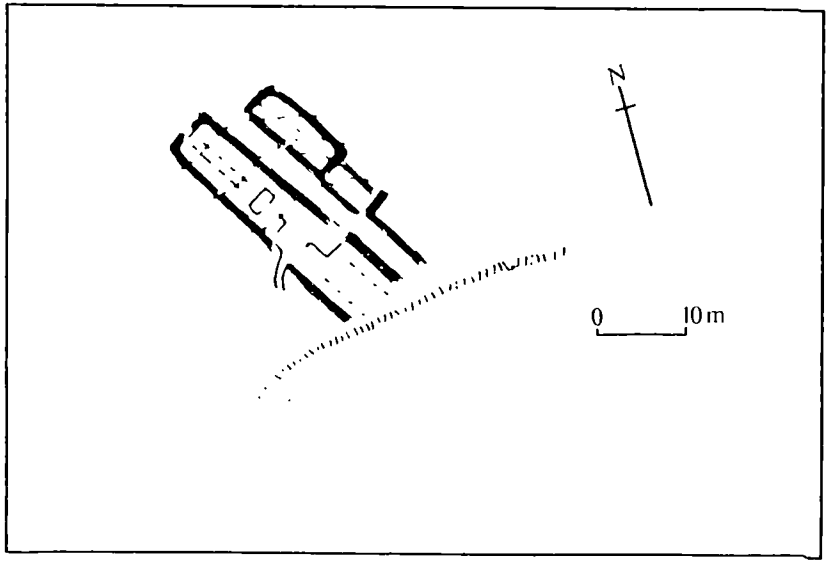


Gazetteer no. *27*

Site name *Westness*

Category	Settlement	Island	Rousay
Location	HY 3754 2964	Parish	Rousay
Aspect	Coastal Facing SW	Nearest landing place	0
Date	C11 - C12 Typ; RC; OS		
Phases	2 C11 - C12		
Place name	ON Vestnes; Vestrnes = Western headland.		
Excavation	Discovered in 1930s; excavation in 1962; 1978-80.		
Description	Along 250m of coast. Farm complex consisting of a longhouse and two smaller byres and a smithy. Paved yard. 30m x 8m with internal divisions.		

Pottery	None
Bone obj	Comb; pin
Steatite	Vessel fragments
Iron	Knives and other tools; rivets
Copper	Fragment of bronze
Clay	None
Stone	Fishing net sinker
Other	Whorl; silver ring; piece of gold; flints; iron slag
Plant	Barley; rye; flax; oats
Bone	Comb; pin
Other	
Status	High status settlement
Association	28,29,30,31,32,170
Survival	Good Erosion rate 0.5
Refs.	Lamb, 1982, no. 85 Kaland, 1973; 1982; OFS no. 34
NMR/SMR	OR 543 Figure (Kaland, 1973)



Gazetteer no. *28*

Site name *Moaness*

Category	Cemetery	Island	Rousay
Location	HY 3753 2929	Parish	Rousay
Aspect	Coastal Facing SW	Nearest landing place	50
Date	C9 -C10 Typ; RC		
Phases	??		
Place name	ON mór = heath headland		
Excavation	Kaland, 1960-70; 1972; 1978-80		
Description	37 graves over the highest point of the Ness. 2 boat graves; oval graves; rectangular graves, orientated E-W and SSW-NNE.		

Pottery	None
Bone obj	Comb
Steatite	None
Iron	Weapons; weaving tools; knives; sickle; rivets
Copper	Bronze brooches; ring-headed pin; bowl; straps; pin
Clay	None
Stone	None
Other	Beads; arrowheads
Plant	Oak; pine
Bone	Comb
Other	
Status	
Association	27,29,30,31,32,170
Survival	Finds: In Norway Erosion rate 0
Refs.	Lamb, 1983, no. 93 Kaland, 1973; Kaland, 1981
NMR/SMR	OR 549 Figure

Gazetteer no. *29*

Site name *Westness*

Category Maritime structure **Island** Rousay
Location HY 3766 2928 **Parish** Rousay
Aspect Coastal **Facing** SW **Nearest landing place** 0
Date C9 - C15 Typ
Phases 2
Place name ON Vestnes; Vestrnes = Western headland
Excavation Kaland, 1973
Description

Rectangular fine stone-built naust originally 10m x 5m wide, dug into the sandbank and aligned NE - Naust now measures 8m x 4.5m.

Pottery None
Bone obj None
Steatite None
Iron Rivets
Copper None
Clay None
Stone None
Other
Plant None
Bone None
Other
Status Boat naust
Association 27,28,30,31,32,170
Survival Sea erosion **Erosion rate** 0.5
Refs. Lamb, 1983, no. 121

NMR/SMR OR 544 **Figure** (Kaland, 1973)

Gazetteer no. *30*

Site name *Swandro*

Category Cemetery **Island** Rousay
Location HY 37 29 **Parish** Rousay
Aspect Coastal **Facing** SW **Nearest landing place** 15
Date C9 - C11 Typ; finds
Phases
Place name
Excavation C19th discovery
Description

Three Viking graves.
May be the site where a shield boss and sword were found.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other Silver finger ring
Plant
Bone
Other
Status
Association 27,28,29,31,32, 170
Survival Finds: NMAS **Erosion rate** 0
Refs. Lamb, 1982, nos. 94, 95, 97

NMR/SMR OR 546; OR 547; **Figure**

Gazetteer no. *31*

Site name *Westness*

Category	Burial	Island	Rousay
Location	HY 3759 2933	Parish	Rousay
Aspect	Coastal Facing SW	Nearest landing place	15
Date	C9 - C11 Finds		
Phases			
Place name	ON Vestnes; Vestrnes = Western headland		
Excavation	Found in 1963.		
Description	Two Viking graves.		

Pottery	None
Bone obj	Comb
Steatite	None
Iron	None
Copper	Two oval and two tortoise brooches; mounts; bowl
Clay	None
Stone	None
Other	Silver pennanular and silver Celtic brooch; 40 beads
Plant	None
Bone	Comb
Other	
Status	
Association	27,28,29,30,32, 170
Survival	Finds: NMAS Erosion rate 0
Refs.	Lamb, 1982, no. 96

NMR/SMR OR 545 Figure

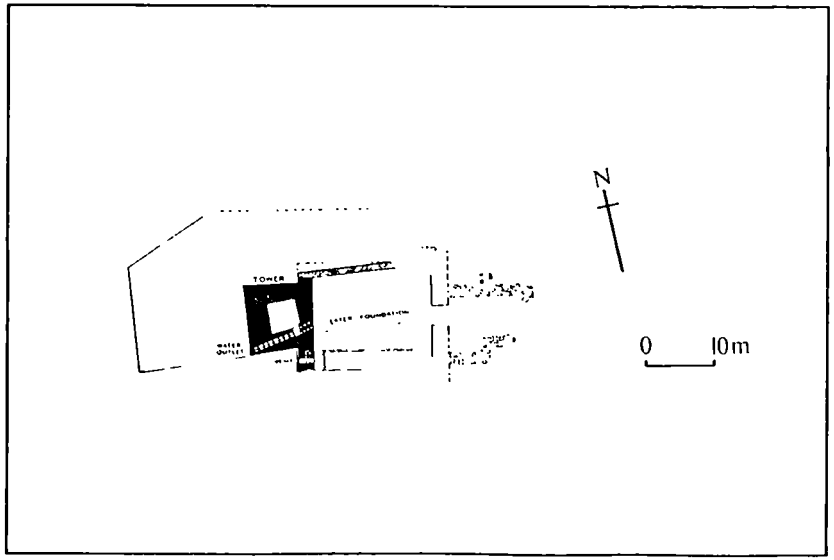
Gazetteer no. *32*

Site name *The Wirk*

Category	Defensive	Island	Rousay
Location	HY 3737 3020	Parish	Rousay
Aspect	Coastal Facing SW	Nearest landing place	40
Date	C10 - C17 Documentary; typ		
Phases			
Place name	ON virki = fortification		
Excavation	Storer-Clouston before 1929		
Description	Building over area 26m Square tower, measuring 7.3m externally, with wall thickness varying from 1,75m to 2.2m. The tower joins a larger rectangular structure to the		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	Fortified church?
Association	27,28,29,30,31,170
Survival	Good Erosion rate 0
Refs.	Lamb, 1982, no. 112; RCAMS, 1946, no. 550

NMR/SMR OR 486 Figure (RCAMS, 1946)



Gazetteer no. *33*

Site name *Skaill*

Category	Settlement	Island	Egilsay
Location	HY 4620 3018	Parish	Rousay
Aspect	Coastal Facing W	Nearest landing place	0
Date	C10 -C13 Finds		
Phases			
Place name	ON skáli = a hall		
Excavation	None. Discovered in 1972.		
Description	Midden refuse and building foundations in disturbed ground around a small croft at Mugley.		

Pottery	Potsherds described as Viking, possibly steatite?
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	Shellfish
Status	
Association	43
Survival	Erosion rate
Refs.	Lamb, 1982, no. 153

NMR/SMR OR 808 Figure

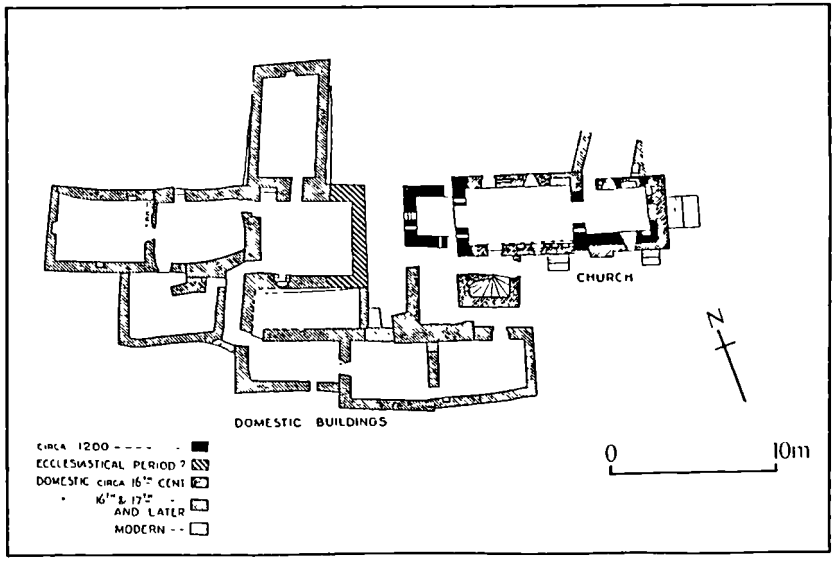
Gazetteer no. *34*

Site name *Eynhallow*

Category	Monastery	Island	Eynhallow
Location	HY 3590 2883	Parish	Rousay
Aspect	Inland Facing	Nearest landing place	120
Date	C12 - C16 Typ; OS		
Phases	5+		
Place name	ON eyin helga = holy island		
Excavation	None. Drawn by Dryden in C19th.		
Description	C11-12 chapel and nave; C14 a new chancel. Also a complex of domestic buildings associated the chapel, but these appear to belong to the C16.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	Monastic
Association	
Survival	Good Erosion rate 0
Refs.	Lamb, 1973, gaz. no. 42; RCAMS, 1946, no. 613 Mooney, 1929

NMR/SMR OR 551 Figure (RCAMS, 1946)



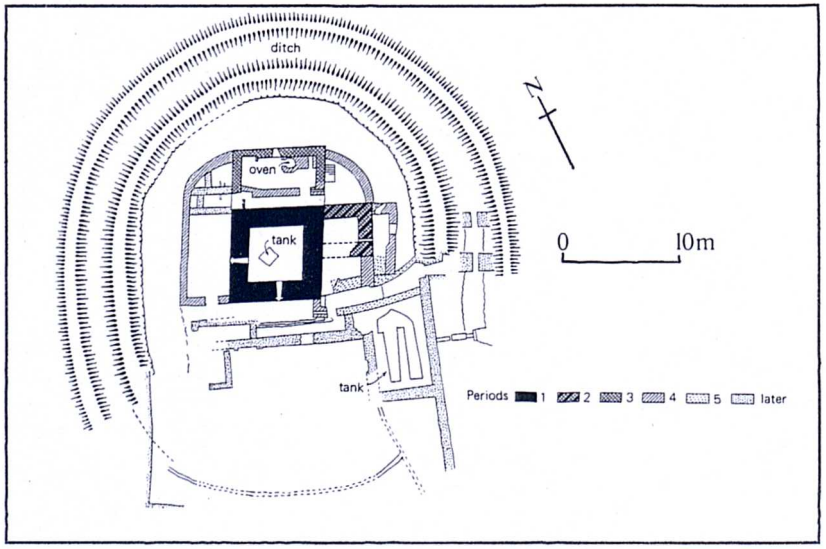
Gazetteer no. *35*

Site name *Cubbie Row's*

Category	Defensive	**Island**	Wyre
Location	HY 4418 2630	**Parish**	Rousay
Aspect	Inland **Facing**	**Nearest landing place**	350
Date	1150 - C15 OS; Typ		
Phases	5		
Place name	Derived from Kolbeinn Hruga (OS).		
Excavation	Excavation in the 1920s by HM Office of Works.		
Description	23m x 29m Small stone tower with encircling ramparts. The tower measures 7.8m x 7.9m with walls 1.7m surviving to a height of 2m.		

Pottery	
Bone obj	
Steatite	
Iron	Chain mail (C12-C15)
Copper	
Clay	
Stone	
Other	Lime mortar
Plant	
Bone	
Other	
Status	Castle
Association	44
Survival	Good **Erosion rate** 0
Refs.	RCAMS, 1946, no. 619

NMR/SMR OR 796 **Figure** (Ritchie & Ritchie, 1978)



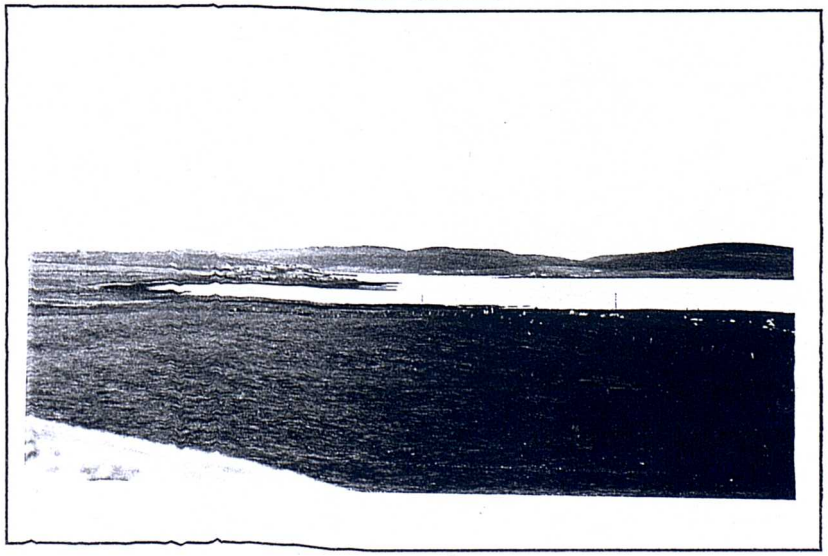
Gazetteer no. *36*

Site name *Osmundwall*

Category	Maritime structure	**Island**	South Walls
Location	ND 334 894	**Parish**	South Walls
Aspect	Coastal **Facing** NE	**Nearest landing place**	0
Date	C10 OS		
Phases			
Place name	ON Asmundavágr = Asmund's bay		
Excavation	None		
Description	Site of the baptism of Jarl Sigurd the Stout in 955 by King Olaf Tryggvason.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	Harbour
Association	173
Survival	Good **Erosion rate** 0
Refs.	

NMR/SMR None **Figure** (Author)



Gazetteer no. *37*

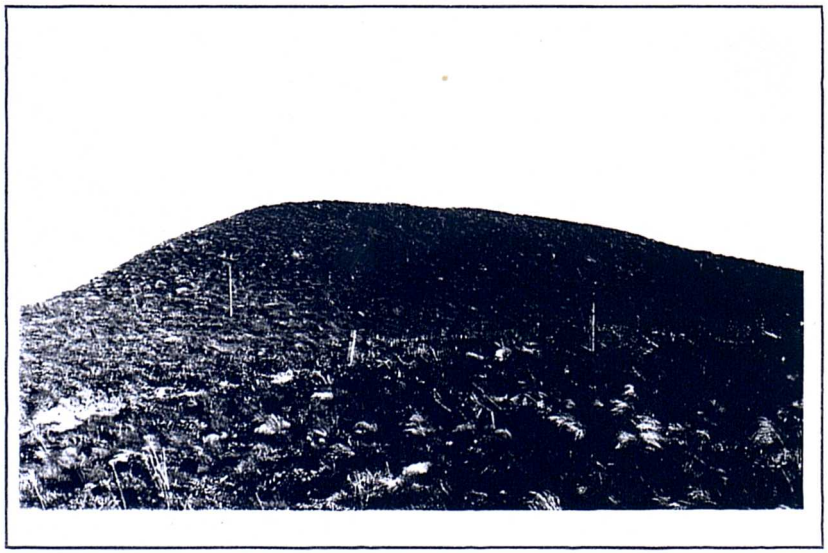
Site name *Dingieshowe*

Category Thing **Island** Mainland
Location HY 5476 0330 **Parish** St. Andrews
Aspect Coastal **Facing** SE **Nearest landing place** 0
Date C5 - C11 Broch; place-name
Phases
Place name ON meaning Thing mound
Excavation Petrie & Farrer revealed broch tower in 1860.
Description

Broch tower, 10m in diameter with walls 3.6m thick. Associated outbuildings. There may be Norse occupation.

Pottery Present
Bone obj Antler; whalebone implements; comb
Steatite
Iron Rivets
Copper
Clay
Stone Present
Other Whorl
Plant
Bone Antler; whalebone implements; comb
Other
Status
Association
Survival Finds: NMAS; THM **Erosion rate** 0.1
Refs. Lamb, 1987, no. 103; RCAMS, 1946, no. 265

NMR/SMR OR 1 **Figure** (Author)



Gazetteer no. *38*

Site name *Quoys*

Category Settlement **Island** Mainland
Location HY 5729 0479 **Parish** St. Andrews
Aspect Inland **Facing** **Nearest landing place** 600
Date C12 - C15 Finds
Phases 3+
Place name ON kví = animal enclosure
Excavation Found in 1974 during renovation work by farmer.
Description

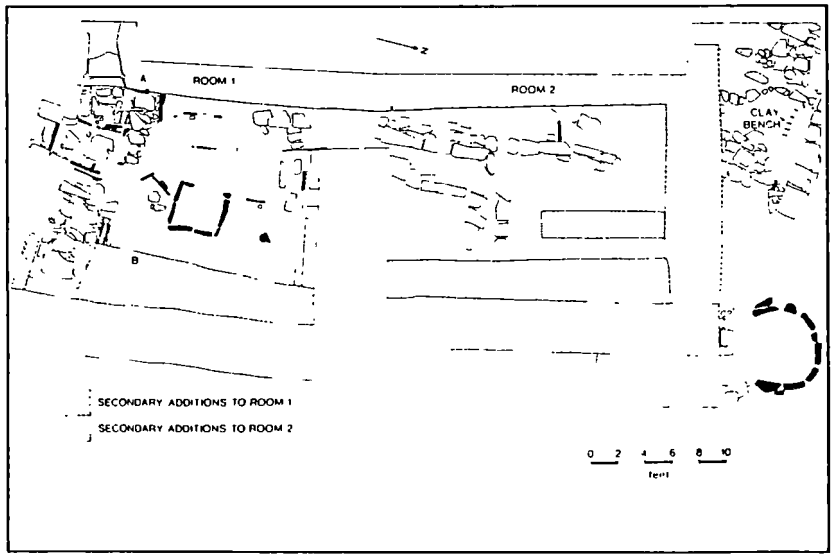
Within a deposit 1m thick were two earlier floors, midden material and a wall.

Pottery None
Bone obj Perforated disc
Steatite Pouring spout
Iron None
Copper None
Clay None
Stone 3 whorls; whetstone; sandstone net sinker; quernstone
Other Lead fishing weight; jetton of gold (C16 intrusive)
Plant None
Bone Perforated disc
Other
Status
Association
Survival Finds: THM **Erosion rate** 0
Refs. Lamb, 1987, no. 116
Steedman, 1980, no. 43
NMR/SMR NMR HY50SE15 **Figure**

Gazetteer no. *39*

Site name *Skaill*

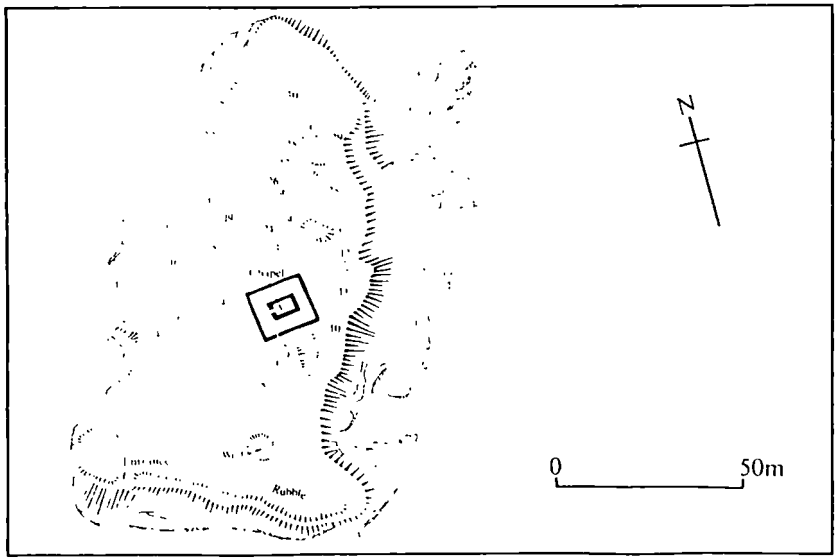
Category	Settlement	Island	Mainland
Location	HY 588 065	Parish	Deerness
Aspect	Coastal Facing E	Nearest landing place	35
Date	LBA - C16 Typ; finds; OS		
Phases	6+ 4 Norse		
Place name	ON Hlaupandanes (OS); ON skáli = hall		
Excavation	Gelling 1970s		
Description	Four superimposed Norse houses; C13 hall; bath-house structure; C12 square stone tower; stone-lined drains and pits; hearths; benches;		
Pottery	Coarse-ware; grass-tempered		
Bone obj	Combs; needles; whalebone cleaver; antler pins		
Steatite	Tuyere; bowl; whorls		
Iron	Rivet		
Copper	Combcase with copper rivets		
Clay	Crucible; loomweight		
Stone	Line-sinker; whorls; pot boilers; lamp; whetstone		
Other	Glass bead		
Plant			
Bone	Combs; needles; whalebone cleaver; antler pins		
Other			
Status	Seat of Thorkel Fosterer		
Association	94,141		
Survival	Good	Erosion rate	0.2
Refs.	Lamb, 1987, no. 120; RCAMS, 1946, no. 629; Steedman, 1980, nos. 38, 40; Gelling, 1984; 1985; OFS		
NMR/SMR	OR 2033	Figure (Gelling, 1984)	



Gazetteer no. *40*

Site name *Brough Deerness*

Category	Settlement	Island	Mainland
Location	HY 5957 0873	Parish	Deerness
Aspect	Coastal Facing N;E	Nearest landing place	0
Date	C10-C18 Documentary; typ; RC		
Phases			
Place name	ON dýrnes = deer headland		
Excavation	Dryden, 1866; RCAMS, 1930; Morris, 1975-77		
Description	0.8 ha Turf-covered foundations of 30+ rectangular buildings. Strong wall or vallum on landward side.		
Pottery	4 fabrics, hand-made locally		
Bone obj	Pin		
Steatite	None		
Iron	23 rivets		
Copper	Pin, vessel rim, C17th coins		
Clay	Pipes C16th - C19th		
Stone	Pumice		
Other	Small amounts of smithing slag; fine silver wire		
Plant	Alder; driftwood; seaweed		
Bone	Pin		
Other	Shellfish; crab		
Status	Possibly monastic		
Association	144; 145		
Survival	Good	Erosion rate	0
Refs.	Lamb, 1987, no. 153; RCAMS, 1946, no. 621 Steedman, 1980, no.8; Morris, 1977, 1978, 1987		
NMR/SMR	OR 1147	Figure (Morris, 1985)	



Gazetteer no. *41*

Site name *Stackel Brae*

Category	Defensive	**Island**	Eday
Location	HY 5641 2884	**Parish**	Eday
Aspect	Coastal **Facing** S	**Nearest landing place**	0
Date	C10 - C17 Typ		
Phases	3+		
Place name	Local name for the site.		
Excavation	None. RCAMS description.		
Description	Mound 35m E-W x 20m N-S x 1.7m high Large coastal mound with dry stone masonry, mortar and kitchen midden visible. Also one clay-bonded wall.		

Pottery	Present
Bone obj	
Steatite	
Iron	
Copper	Bronze object fragment
Clay	
Stone	
Other	Early glass
Plant	
Bone	
Other	Shellfish
Status	Settlement.
Association	
Survival	**Erosion rate** 2
Refs.	Lamb, 1984, no. 29; RCAMS, 1946, no. 241

NMR/SMR OR 741 **Figure** (Author)

Gazetteer no. *42*

Site name *Danes' Pier*

Category	Maritime structure	**Island**	Stronsay
Location	HY 6876 2142	**Parish**	Stronsay
Aspect	Coastal **Facing** S	**Nearest landing place**	0
Date			
Phases			
Place name	Local name.		
Excavation	None		
Description	Spit 20-30m wide x 400 m long. L-shaped spit of loosely piled large stones. It is almost certainly formed by the confluence of tidal streams at this point.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	Natural spit
Association	
Survival	Good **Erosion rate** 0.5
Refs.	Lamb, 1984, no. 168; RCAMS, 1946, no. 966

NMR/SMR OR 163 **Figure**

Gazetteer no. *43*

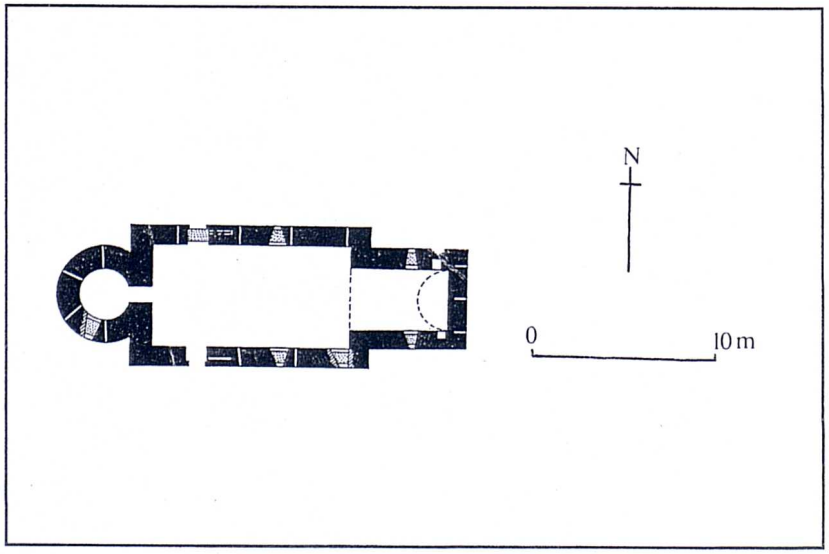
Site name *St. Magnus*

Category Chapel
Location HY 4661 3038
Aspect Inland Facing
Date C12-C17 Typ; OS
Phases
Place name
Excavation None
Description c. 22m by 8m
Tricameral stone chapel, consisting of nave, chancel and round tower, similar to C11 Irish
Established c. 1135 by Bishop William.

Island Egilsay
Parish Rousay
Nearest landing place 400

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Special commission
Association 33
Survival Good Erosion rate 0
Refs. Lamb, 1982, no. 154; RCAMS, 1946, no. 611; Lowe, 1987
NMR/SMR OR 807

Figure (RCAMS, 1946)



Gazetteer no. *44*

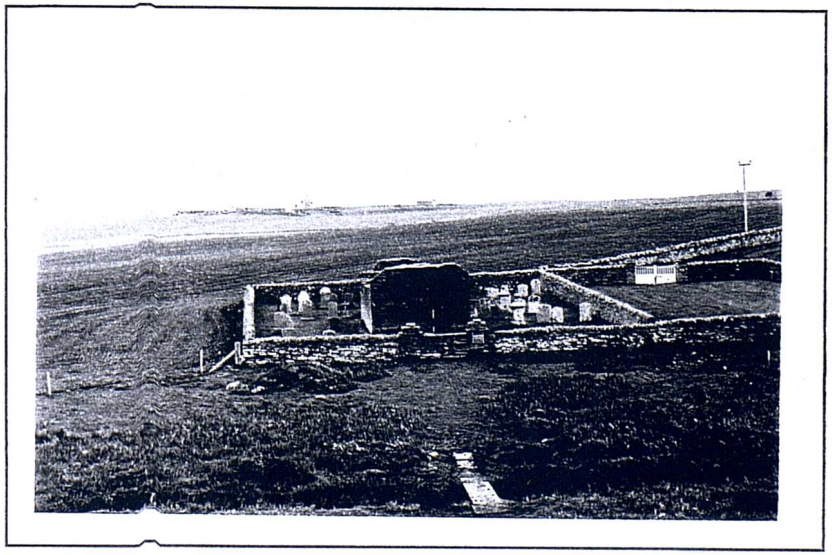
Site name *St. Mary*

Category Chapel
Location HY 4430 2629
Aspect Inland Facing
Date C12-C19 Typ
Phases
Place name Also called St. Peter's; Cubberow Chapel
Excavation None. Surveyed by Dryden, 1866.
Description c. 11m by 6m
Bicameral chapel within a churchyard.
Nave and chancel with round chancel arch and round-arched door to nave.

Island Wyre
Parish Rousay
Nearest landing place 400

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Parish chapel
Association 35
Survival Good Erosion rate 0
Refs. Lamb, 1982, no. 161; RCAMS, 1946, no.618
NMR/SMR OR 795

Figure (Author)

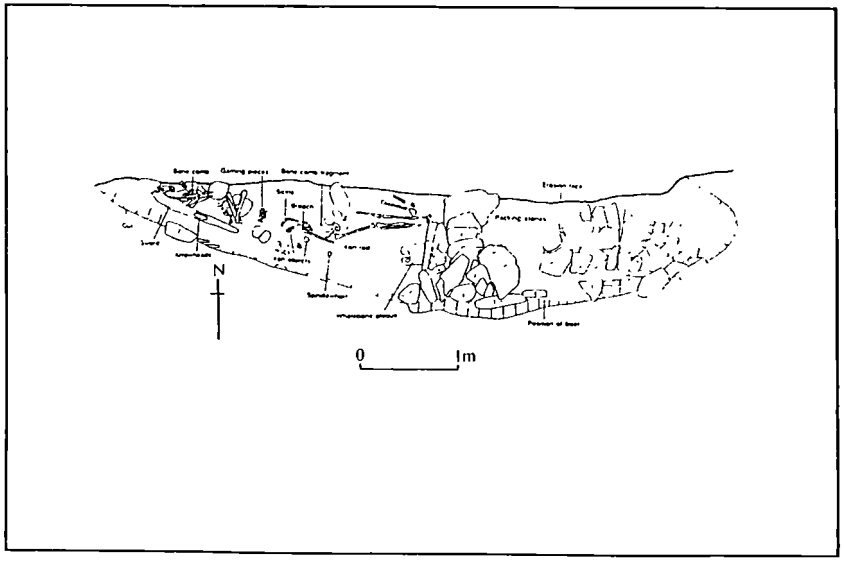


Gazetteer no. *45*

Site name *Scar*

Category	Burial	Island	Sanday
Location	HY 674 455	Parish	Cross & Burness
Aspect	Coastal Facing NW	Nearest landing place	0
Date	C9 Finds		
Phases			
Place name			
Excavation	Rescue excavation by AOC in December 1991		
Description	7.5m x 3m Boat burial in stone-lined pit, flat grave. Chamber within boat formed by blocking end with stone packing. Boat 8-oared, 5 strakes, W.		

Pottery	None
Bone obj	Two combs; gaming pieces; whalebone plaque
Steatite	None
Iron	Sword; knife; shears; rivets; rod; sickle
Copper	Brooch
Clay	None
Stone	None
Other	Wooden boat; wooden box with iron fastenings; arrows
Plant	
Bone	Two combs; gaming pieces; whalebone plaque
Other	Fish (intrusive from otter's nest)
Status	
Association	
Survival	Finds: AOC Scotland Erosion rate 1
Refs.	Dalland, 1992; Bowman, 1992
NMR/SMR	OR 259; NMR Figure (Dalland, 1992)

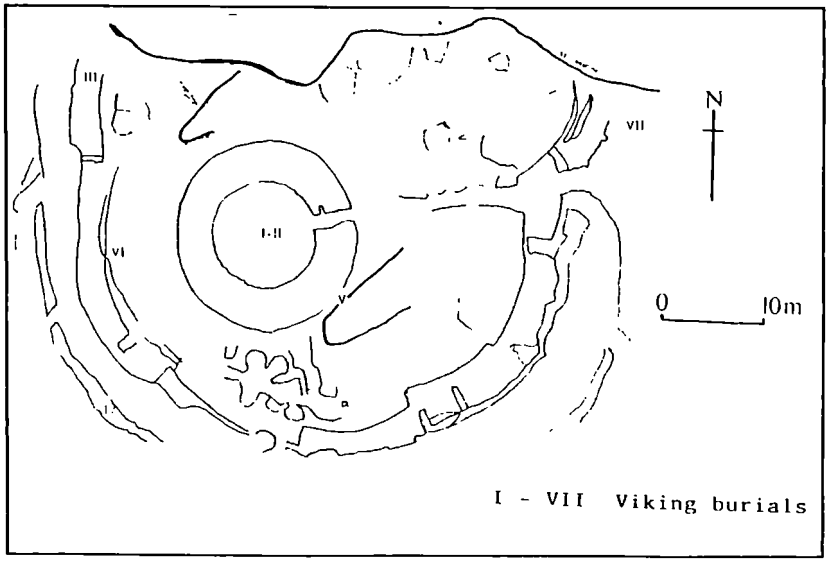


Gazetteer no. *46*

Site name *Gurness*

Category	Cemetery	Island	Mainland
Location	HY 3810 2670	Parish	Evie
Aspect	Coastal Facing N	Nearest landing place	0
Date	C9 Typ; finds		
Phases			
Place name	Local name for site.		
Excavation	Excavated 1930-9 by Craw & Richardson		
Description	Broch mound is 60m in diameter. Burial of woman in a stone cist. A further six burials have been postulated on the basis of goods.		

Pottery	None
Bone obj	Pin
Steatite	None
Iron	Sickle; knife; 2 shield bosses; necklet
Copper	Two tortoise brooches; pin; rings; folding balance
Clay	None
Stone	Whetstone; amber and jet beads
Other	Woollen cloth; shell necklet; wooden handle; iron ore
Plant	None
Bone	Pin
Other	
Status	
Association	47,87
Survival	Finds: THM Erosion rate 0
Refs.	RCAMS, 1946, no.263 Hedges, 1987; OFS 24
NMR/SMR	OR 1183 Figure (Hedges, 1987)



Gazetteer no. *47*

Site name *Gurness*

Category Settlement **Island** Mainland
Location HY 3810 2670 **Parish** Evie
Aspect Coastal **Facing** N **Nearest landing place** 0
Date C5 - C11 Typ; finds; stratigraphy
Phases 4+
Place name Local name for site.
Excavation Excavated 1930-9 by Craw & Richardson.
Description Broch mound is 60m in diameter.
Two longhouses, one 18 x 13m internally, the other 9 x 2.2m. There are associated paved surfaces buildings and a ground set tank 1m x 0.5m x 0.6m

Pottery
Bone obj
Steatite
Iron
Copper Bronze ring-headed pin
Clay
Stone
Other
Plant
Bone
Other
Status
Association 46; 87
Survival Good **Erosion rate** 0
Refs. RCAMS, 1946, no.263
Hedges, 1987; OFS 24
NMR/SMR OR 1183 **Figure** (Author)

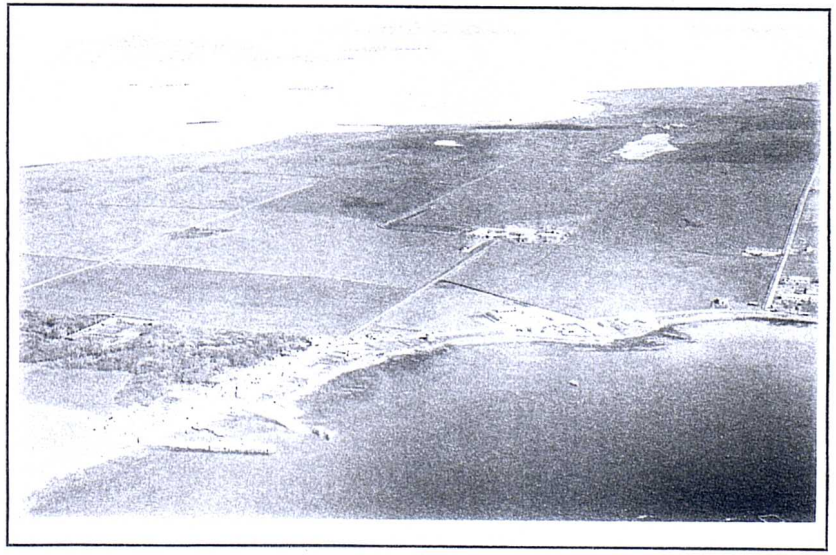
Gazetteer no. *48*

Site name *Elwick Bay*

Category Coastal installation **Island** Shapinsay
Location HY 484 167 **Parish** Shapinsay
Aspect Coastal **Facing** S **Nearest landing place** 0
Date C12-15 Local tradition; documentary
Phases
Place name ON vík = bay
Excavation None
Description
King Haakon's ships apparently lay anchored here in 1263 before setting off for the Battle of

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Natural harbour
Association
Survival Good **Erosion rate** 0
Refs.

NMR/SMR None **Figure** (Author)



Gazetteer no. *49*

Site name *Buckquoy*

Category	Burials	Island	Mainland
Location	HY 2428 2837	Parish	Birsay
Aspect	Coastal Facing W	Nearest landing place	0
Date	C10 Coin		
Phases	1		
Place name	Known locally as Sinclair's Brae		
Excavation	Ritchie, 1977		
Description	Cist 2m x 0.7m Male burial in cist and grave goods. A second cist without goods was also found. This contained skeleton of a man between 25 and 30 years.		

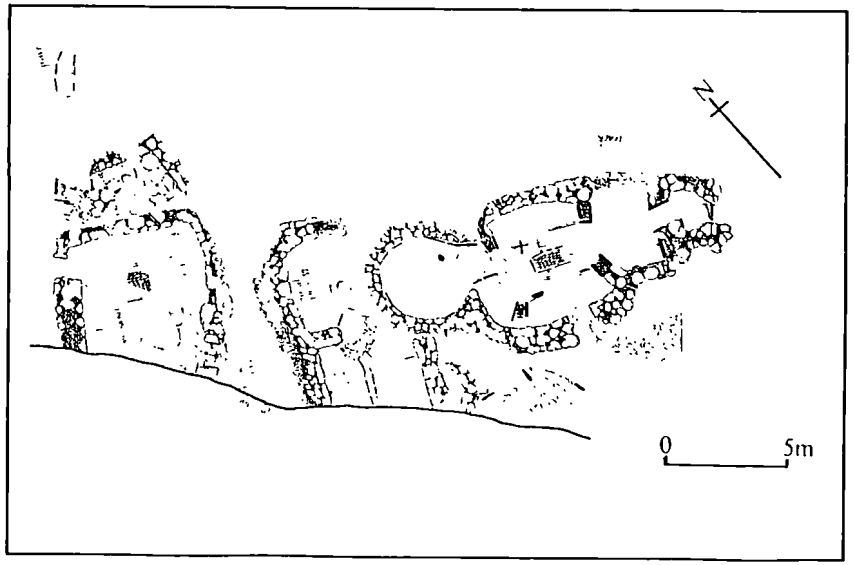
Pottery	None
Bone obj	Mount
Steatite	None
Iron	Knife, spearhead; buckle
Copper	Bronze ring-headed pin
Clay	None
Stone	Whetstone
Other	Silver penny of King Edmund (940-6)
Plant	None
Bone	Mount
Other	
Status	
Association	50
Survival	Erosion rate 0.5
Refs.	Ritchie, 1977; Laing, 1974
NMR/SMR	OR 1669 Figure (see 50)

Gazetteer no. *50*

Site name *Buckquoy*

Category	Settlement	Island	Mainland
Location	HY 2428 2837	Parish	Birsay
Aspect	Coastal Facing W	Nearest landing place	0
Date	C7-10 Typ		
Phases	6 2 Pictish; 4 Norse		
Place name	see 49; ON kvi = enclosue; bygg = bere		
Excavation	Ritchie, 1977		
Description	Settlement mound 20m long and 0.5m high. III) Barn dismantled and overlain by dwelling house; IV) small paved barn; V) longhouse; Originally there were more buildings in each		

Pottery	Grass-tempered
Bone obj	Pins and combs of Pictish type; handles
Steatite	None
Iron	Knives; nails; rivets
Copper	None
Clay	None
Stone	Spindle whorls; 3 gaming boards; whetstone
Other	Two glass beads; lead weight
Plant	Seaweed
Bone	Pins and combs of Pictish type; handles
Other	Shellfish; crab
Status	
Association	49
Survival	Sea erosion Erosion rate 0.5
Refs.	Ritchie, 1974; 1977; 1983
NMR/SMR	OR 1669 Figure (Ritchie, 1983)

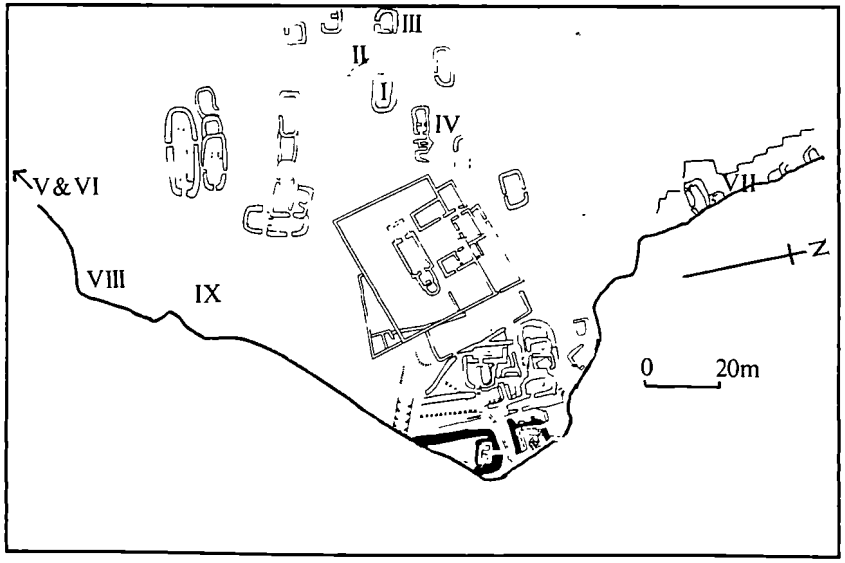


Gazetteer no. *51*

Site name *Brough of Birsay*

Category	Settlement	Island Mainland	
Location	HY 240 285	Parish Birsay	
Aspect	Coastal **Facing** W	**Nearest landing place**	0
Date	C8 - C15	*Typ; documentary; finds; RC*	
Phases	4 Pictish; 3 Norse		
Place name	ON Byrgisherad = fort headland		
Excavation	1866-7 ; 1934-9; 1956-61; Morris & Hunter 1974-81		
Description	9 excavated areas on the promontory 500m x 140m. Chapel, graveyard, associated range of buildings. Series of dwelling houses, halls, industrial Slab-lined drains; a bath-house; a smithy; flagged		

Pottery	Crucibles and moulds (pre-Norse?); local pottery
Bone obj	Combs; pins; needles; weaving tablet; stretcher
Steatite	Whorls; moulds for bronze bars; vessel fragments
Iron	Bell;rivets;buckle;knives;rings;handles;bars;chain
Copper	Gilt disc;brooch;pins;tweezers;bar;rings;belt fitting
Clay	Tuyeres; blowpipe fragment
Stone	Whetstones; sinkers;whorls;pumice;jet & shale armlets
Other	Glass vessel;beads;tessera;runes;lead sinker & whorls
Plant	Barley; oats; wood; heather; crowberry; seaweed
Bone	Combs; pins; needles; weaving tablet; stretcher
Other	Shellfish; barnacles
Status	Earl's residence
Association	2,52,53
Survival	Good **Erosion rate** 0.5
Refs.	RCAMS, 1946, no. 1; Cruden, 1965; Morris & Hunter, Curle, 1982; Hunter, 1983; Hunter, 1986; Morris,
NMR/SMR	NMR HY22NW1 **Figure** (Hunter, 1983)

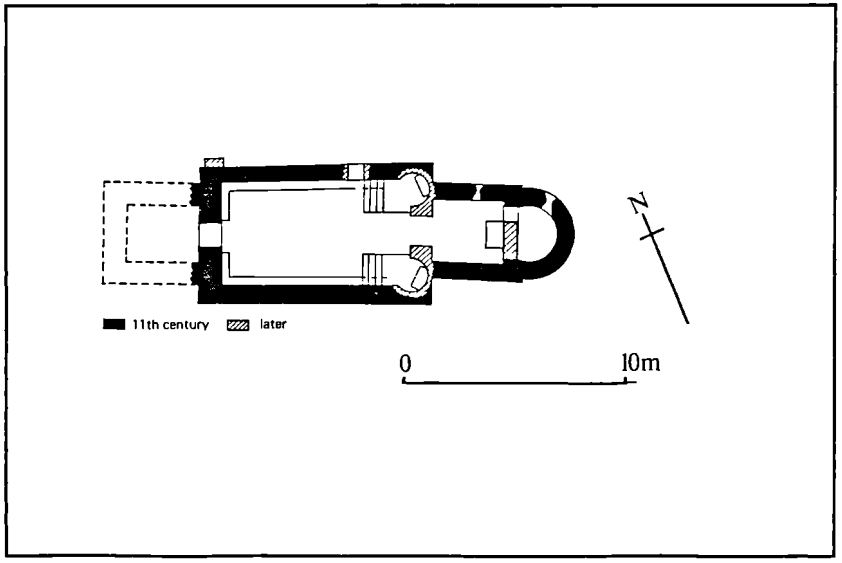


Gazetteer no. *52*

Site name *Brough of Birsay*

Category	Chapel	Island Mainland	
Location	HY 239 285	Parish Birsay	
Aspect	Coastal **Facing** W	**Nearest landing place**	40
Date	C11 - C12	*Typ; documentary*	
Phases	2		
Place name	Dedicated to St. Peter		
Excavation	Dryden 1866-7; HM Works 1934-39; Cruden 1956-61		
Description	c. 40 x 40m Bicameral chapel surrounded by a rectangular graveyard. Nave 8.8 x 4.9m; choir 3.4m long; apse Irregularly coarsed rubble and mortar		

Pottery	Two sherds of grass-tempered; *imported M & PM pottery*
Bone obj	Gaming piece; whalebone board; antler handle
Steatite	None
Iron	None
Copper	None
Clay	None
Stone	None
Other	Lime mortar
Plant	None
Bone	Gaming piece; whalebone board; antler handle
Other	None
Status	
Association	2,51,53
Survival	Good **Erosion rate** 0
Refs.	RCAMS, 1946, no. 1 Curle, 1982
NMR/SMR	NMR HY22NW1 **Figure** (Ritchie & Ritchie, 1978)



Gazetteer no. *53*

Site name *Brough of Birsay*

Category	Cemetery	**Island**	Mainland
Location	HY 240 285	**Parish**	Birsay
Aspect	Coastal **Facing** W	**Nearest landing place**	20
Date	C8 - C12 Typ; association		
Phases			
Place name	ON Byrgisherad = fort headland		
Excavation	HM Works 1930-9; Cruden 1956-61		
Description	c. 40 x 40m Cist graves in graveyard 052. Orientated E-W. One triple grave. Finds from 052 & 053 not		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	Two Pictish symbol stones; incised cross-slab
Other	
Plant	
Bone	
Other	
Status	
Association	2,51,52
Survival	*Erosion rate 0*
Refs.	RCAMS, 1946, no. I Curle, 1982
NMR/SMR	NMR HY22NW1 **Figure** (Author)

Gazetteer no. *54*

Site name *Earl's Bu*

Category	Settlement	**Island**	Mainland
Location	HY 3370 0420	**Parish**	Orphir
Aspect	Inland **Facing**	**Nearest landing place**	200
Date	C9 - C15 OS; Typ		
Phases			
Place name	Name given by excavators; Örfjara in OS		
Excavation	1900-I Flett		
Description	c. 40 x 40m Numerous massive walls adjacent to the church 055. OS describes a large hall.		

Pottery	
Bone obj	Comb; antler handle
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	Comb; antler handle
Other	Ashes; oyster shells
Status	Huseby farm
Association	55,81,99,117,152
Survival	Good **Erosion rate** 0.3
Refs.	RCAMS, 1946, no. 485
NMR/SMR	OR 1426 **Figure** (Author)

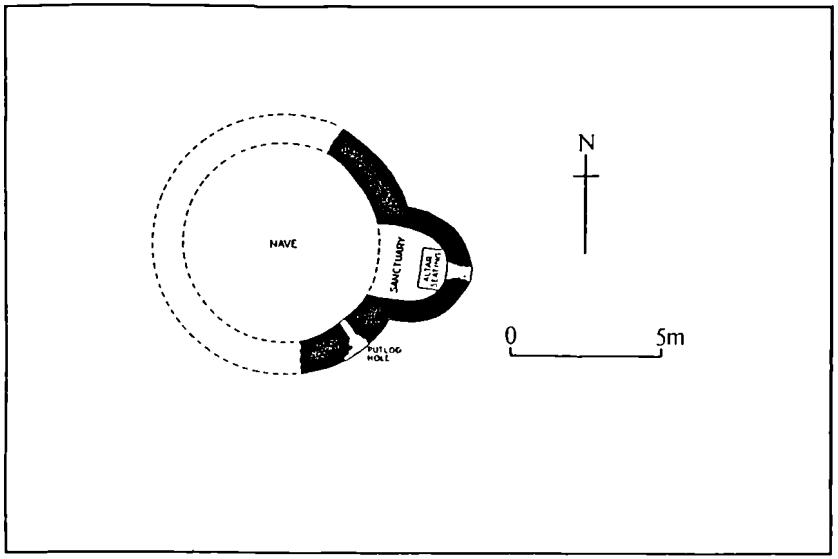
Gazetteer no. *55*

Site name *Round church*

Category	Chapel	Island	Mainland
Location	HY 3370 0420	Parish	Orphir
Aspect	Inland Facing	Nearest landing place	200
Date	1090 - 1160 - C18 OS; typ		
Phases			
Place name	Dedicated to St. Nicholas		
Excavation	None		
Description	c. 10 x 6m Round church, originally 6m in diameter and 6m high. Nave and apse, vaulted. Mortared rubble		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	Runic inscription; lime mortar
Plant	
Bone	
Other	
Status	Urisland chapel
Association	54,81,99,117,152
Survival	Finds: THM; Structure: good Erosion rate 0.3
Refs.	RCAMS, 1946, no. 483

NMR/SMR OR 1427 Figure (RCAMS, 1946)



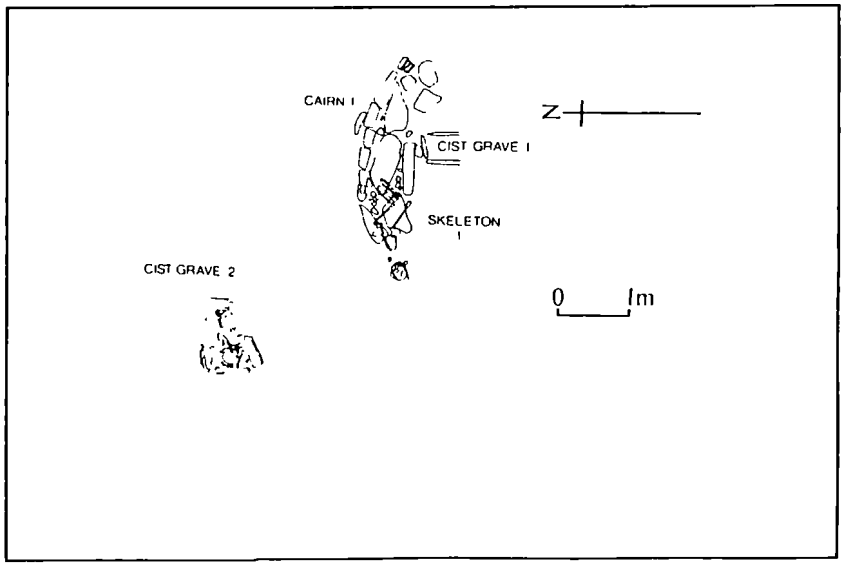
Gazetteer no. *56*

Site name *S. of Red Craig*

Category	Burials	Island	Mainland
Location	HY 2467 2806	Parish	Birsay
Aspect	Coastal Facing W	Nearest landing place	0
Date	C7 - C12 Typ; RC		
Phases	6 3 Viking/Norse		
Place name	Local name for red sandstone cliff.		
Excavation	Morris, 1978 (Area 1)		
Description	Excavation area 6m x 2m; 11m x 5m Poorly constructed cist containing disartjculated skeleton, cut into contemporary midden. A second without goods lay on top of a cairn. (Site phases		

Pottery	None
Bone obj	Antler comb
Steatite	None
Iron	Knife; 4 pieces of iron; 2 nails
Copper	None
Clay	None
Stone	None
Other	None
Plant	Alder; willow; sedge; barley; kelp; burnt peat
Bone	Antler comb
Other	Shellfish; barnacles; crab
Status	
Association	60
Survival	Destroyed Erosion rate 0.5
Refs.	Morris, 1987, 126

NMR/SMR NMR HY2ONE18 Figure (Morris, 1983)



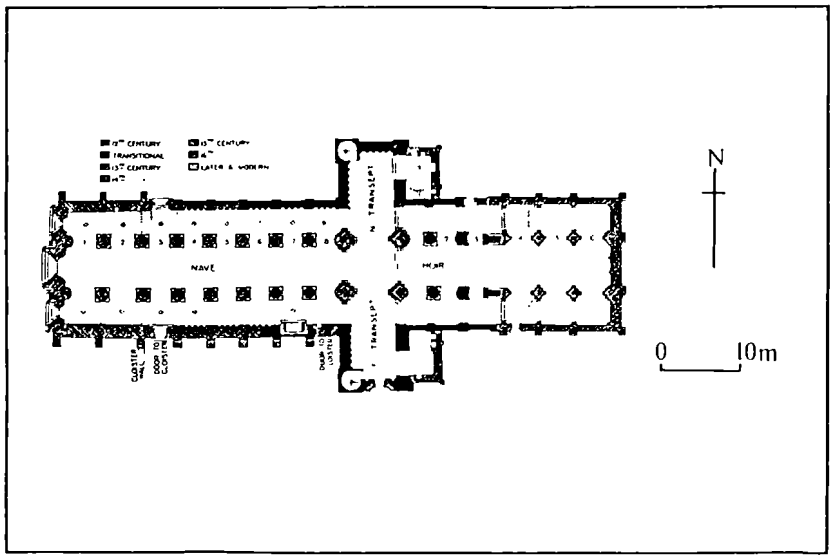
Gazetteer no. *57*

Site name *Cathedral*

Category	Cathedral	Island	Mainland
Location	HY 4490 1100	Parish	Kirkwall
Aspect	Coastal Facing N	Nearest landing place	20
Date	1137 - C20	OS; typ; finds	
Phases	7+ C12; trans; C13; C14; C15; C15; C16;		
Place name	Dedicated to St. Magnus.		
Excavation	None; RCAMS description, 1930		
Description	Within churchyard Original design for cruciform Romanesque church. C13 extension of choir. W facade not completed Hewn sandstone, including some from Hoy used.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	C11 type Hogback tombstone
Plant	
Bone	
Other	
Status	Cathedral
Association	75,89,118,136,137,157,169,171,176
Survival	Excellent Erosion rate 0
Refs.	RCAMS, 1946, no. 399

NMR/SMR OR 1565 Figure (RCAMS, 1946)



Gazetteer no. *58*

Site name *Saevar Howe*

Category	Cemetery	Island	Mainland
Location	HY 2460 2700	Parish	Birsay
Aspect	Coastal Facing W	Nearest landing place	50
Date	C10 - C15	Typ; coin; stratigraphy; RC	
Phases			
Place name	Also known as Saverough.		
Excavation	Farrer, 1862; Hedges, 1977		
Description	Hillock, 55m in diameter and 3.5m high. Fourteen Christian Norse graves in cists, orientated NW - SE. Only one had grave goods.		

Pottery	Hand made pottery
Bone obj	None
Steatite	None
Iron	Bronze clad bell
Copper	None
Clay	None
Stone	None
Other	
Plant	None
Bone	None
Other	
Status	
Association	59
Survival	Sea erosion Erosion rate 0.5
Refs.	RCAMS, 1946, no. 40 Farrer, 1862; 1868; Hedges, 1983

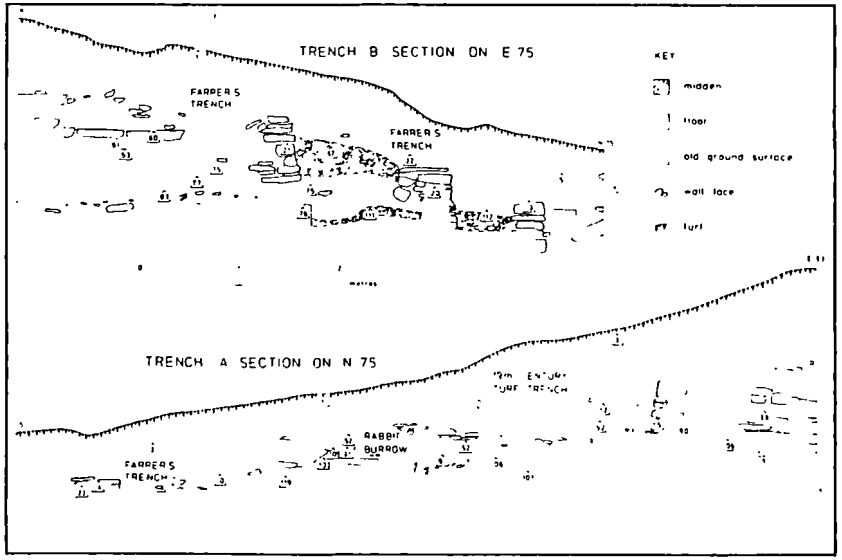
NMR/SMR OR 1663 Figure

Gazetteer no. *59*

Site name *Saevar Howe*

Category	Settlement	Island	Mainland
Location	HY 2460 2700	Parish	Birsay
Aspect	Coastal Facing W	Nearest landing place	50
Date	C5 - C11 Typ; finds; stratigraphy; RC		
Phases	6 3 Pictish; 3 Viking		
Place name	Also known as Saverough		
Excavation	Farrer C19; Hedges, 1977		
Description	Hillock, 55m in diameter and 3.5m high. Three superimposed Norse houses. The earliest structure was poorly preserved. The two later houses, between 11 and 12m long with internal		

Pottery	None
Bone obj	Pins; combs; whorls; points; tubes; needle cases
Steatite	Loomweight; vessel fragments; complete cup; whorls
Iron	Rivets; knife blades; nails; spearhead
Copper	None
Clay	Hand line weight; hammerstone; whetstones; loomweight
Stone	Loomweights
Other	Coin; glass fragment; stone whorls; whalebone plaque
Plant	Spruce; willow; birch; heather; alder; juniper; oats
Bone	Pins; combs; whorls; points; tubes; needle cases
Other	shellfish; barley; flax; crowberry; seaweed
Status	
Association	58
Survival	Sea erosion Erosion rate 0.5
Refs.	RCAMS, 1946, no. 40 Hedges, 1983; Farrer, 1862; 1868
NMR/SMR	OR 1663 Figure (Hedges, 1983)

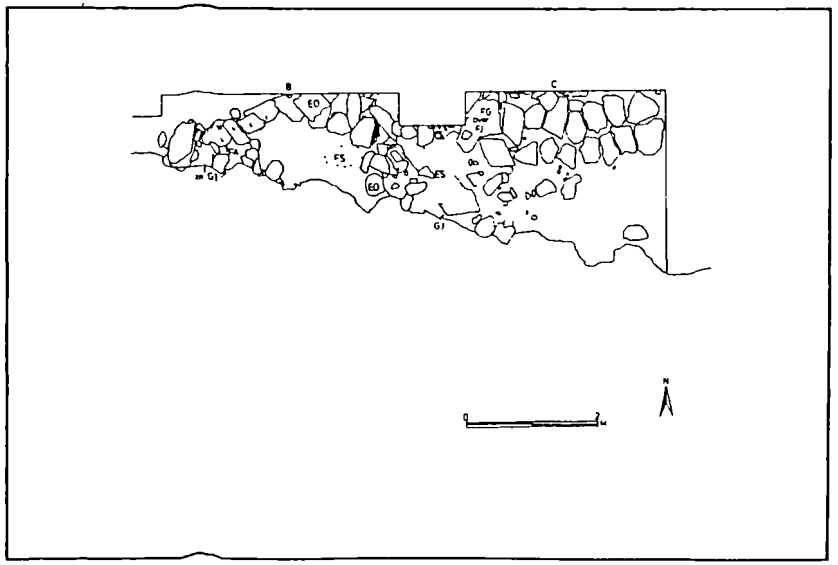


Gazetteer no. *60*

Site name *S. of Red Craig*

Category	Settlement	Island	Mainland
Location	HY 2466 2807	Parish	Birsay
Aspect	Coastal Facing W	Nearest landing place	0
Date	C7 - C13 Typ; RC; stratigraphy		
Phases	3		
Place name	Local name for sandstone cliff.		
Excavation	Morris, 1978 (Area 2)		
Description	Excavation area 15.5 x 4m. Phase B - stone spreads and flagging; Phase C - midden and occupation debris (=056); Phase D - cist grave with skeleton and iron object.		

Pottery	None
Bone obj	Antler comb fragments; needle
Steatite	None
Iron	Fragments recorded; nails
Copper	Stud
Clay	None
Stone	Whetstone
Other	Industrial waste; flint; mortar; amber
Plant	Birch; heather; pine; spruce; willow; oats; barley
Bone	Antler comb fragments; needle
Other	Shellfish; barnacles; crab; peat; crowberry
Status	
Association	56
Survival	Erosion rate 0.5
Refs.	Morris, 1987
NMR/SMR	NMR HY22NW16 Figure (Morris, 1987)


B
C
EO
EO
EO

Gazetteer no. *61*

Site name *Sandside*

Category	Burial	Island	Graemsay
Location	HY 26 05	Parish	Hoy
Aspect	Coastal Facing N	Nearest landing place	0
Date	C12 RC		
Phases	1		
Place name			
Excavation	Discovered in 1977.		
Description	c. 2m x 1m. A long cist grave containing the skeleton of a man 1.72m tall and between 40 and 45 years old. The was 2m long and 0.65m wide.		

Pottery	None
Bone obj	None
Steatite	None
Iron	None
Copper	None
Clay	None
Stone	None
Other	
Plant	None
Bone	None
Other	
Status	
Association	
Survival	Erosion rate 0.5
Refs.	Hedges, 1978; Lowe, 1987,88
NMR/SMR	NMR HY2ONE28 Figure

Gazetteer no. *62*

Site name *North Town Moss*

Category	Hoard	Island	Burray
Location	ND 4550 9658	Parish	Burray
Aspect	Inland Facing	Nearest landing place	500
Date	c. A.D. 998 Coins		
Phases			
Place name			
Excavation	Found in 1889		
Description	Wooden bowl containing a silver hoard.		

Pottery	None
Bone obj	None
Steatite	None
Iron	None
Copper	None
Clay	None
Stone	None
Other	26 silver ring money; 100+ pieces of hack silver;
Plant	None
Bone	None
Other	
Status	Hoard
Association	114
Survival	Finds: NMAS Erosion rate
Refs.	RCAMS, 1946, no. 867 Stevenson, 1966, no. 18; Dolley, 1966, no. 132
NMR/SMR	OR 1785 Figure

Gazetteer no. 63

Site name *Skaill*

Category	Hoard	Island	Mainland
Location	HY 237 196	Parish	Sandwick
Aspect	Inland Facing	Nearest landing place	350
Date	c. A.D. 950 Coins		
Phases			
Place name	ON skáli = hall		
Excavation	Found in 1858 & excavated by locals.		
Description	None		

Pottery	None
Bone obj	None
Steatite	None
Iron	None
Copper	None
Clay	None
Stone	None
Other	14 neck rings; arm rings; 23 armlets (ring money)
Plant	None
Bone	None
Other	
Status	
Association	71,78,138,153
Survival	Finds: NMAS Erosion rate
Refs.	RCAMS, 1946, no. 734 Stevenson, 1966, no. 22; Dolley, 1966, no. 84
NMR/SMR	OR 1248 Figure

Gazetteer no. 64

Site name *Caldale*

Category	Hoard	Island	Mainland
Location	HY 41 10	Parish	Kirkwall
Aspect	Inland Facing	Nearest landing place	
Date	c. A.D. 1025 Coins		
Phases			
Place name			
Excavation	Found in 1774		
Description	None		

Pottery	None
Bone obj	None
Steatite	None
Iron	None
Copper	None
Clay	None
Stone	None
Other	Silver armlets (ring money) and 300 coins.
Plant	None
Bone	None
Other	
Status	Hoard
Association	75,89,118,176
Survival	Finds: BM Erosion rate
Refs.	Stevenson, 1966, no. 18; Dolley, 1966, no. 152
NMR/SMR	Figure

Gazetteer no. *65*

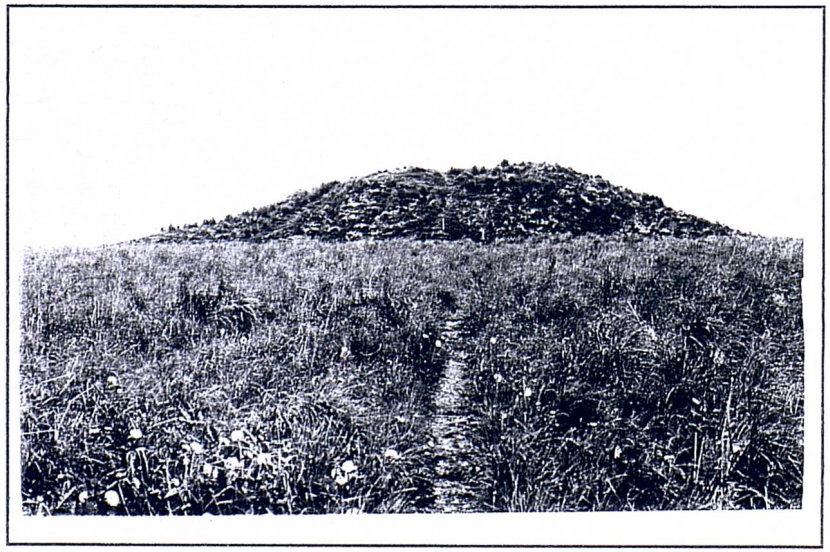
Site name *Ring of Brodgar*

Category Hoard
Location HY 2927 1328
Aspect Loch **Facing**
Date C10 - C11 Finds
Phases
Place name Locally known as Salt Knowe
Excavation Mentioned by Wallace, 1700
Description Mound 18m in diameter and 6m high. Found in a tumulus to the west of the Ring of Brodgar.

Island Mainland
Parish Stenness
Nearest landing place 200

Pottery None
Bone obj None
Steatite None
Iron None
Copper None
Clay None
Stone None
Other Nine silver rings (ring money)
Plant None
Bone None
Other
Status Hoard
Association 66
Survival Now lost **Erosion rate**
Refs. Wallace, 1700

NMR/SMR OR 1356 **Figure** (Author)



Gazetteer no. *66*

Site name *Loch Stenness*

Category Hoard
Location
Aspect Loch **Facing**
Date C10 - C11 Finds
Phases
Place name
Excavation Found in 1879.
Description None

Island Mainland
Parish Stenness
Nearest landing place

Pottery None
Bone obj None
Steatite None
Iron None
Copper None
Clay None
Stone None
Other Four gold finger rings
Plant None
Bone None
Other None
Status Hoard
Association 65
Survival Finds: NMAS **Erosion rate**
Refs. RCAMS, 1946, no. 319

NMR/SMR OR 1363 **Figure**

Gazetteer no. *67*

Site name *Lyking*

Category Burial
Location HY 271 152
Aspect Loch Facing S
Date C9 - C11 Finds
Phases
Place name ON leik vin = games pasture
Excavation Found in 1870.
Description

A grave mound. No further details available.

Island Mainland
Parish Sandwick
Nearest landing place 30

Pottery None
Bone obj Comb
Steatite None
Iron Spearhead; strap-buckle
Copper None
Clay None
Stone None
Other
Plant
Bone Comb
Other Ash
Status
Association 104,119,166
Survival Finds: NMAS Erosion rate 0
Refs. RCAMS, 1946, no. 758
Catalogue of the NMAS, 1892, 276
NMR/SMR OR 1284 Figure

Gazetteer no. *68*

Site name *Stenness*

Category Burial
Location HY 32 11
Aspect Facing
Date C9 - C11 Finds
Phases
Place name
Excavation Discovered in 1902.
Description

Grave-mound containing a skeleton.

Island Mainland
Parish Stenness
Nearest landing place

Pottery None
Bone obj None
Steatite None
Iron None
Copper Ring-headed pin
Clay None
Stone None
Other
Plant None
Bone None
Other
Status
Association
Survival Erosion rate
Refs. RCAMS, 1946, no. 60
NMR/SMR OR 1368 Figure

Gazetteer no. *69*

Site name *Howe of Howe*

Category	Settlement	Island	Mainland
Location	HY 276 109	Parish	Stromness
Aspect	Inland Facing	Nearest landing place	500
Date	C5 - C11	Finds; typ	
Phases	4+	IA ring fort; broch; Pictish; Viking	
Place name	Mound is called the Hillock of Howe		
Excavation	C19; Hedges, 1979		
Description	Mound with distinct evidence of stone construction Rectilinear structure on top of the mound may be origin.		

Pottery	None
Bone obj	None
Steatite	None
Iron	None
Copper	None
Clay	None
Stone	None
Other	Black glass linen smoother
Plant	None
Bone	None
Other	
Status	
Association	
Survival	Erosion rate
Refs.	RCAMS, 1946, no. 921 Hedges et al, 1980
NMR/SMR	OR 1495 Figure

Gazetteer no. *70*

Site name *Gyron Hill*

Category	Isolated find	Island	Mainland
Location	HY 242 158	Parish	Sandwick
Aspect	Inland Facing	Nearest landing place	1500
Date	?C5 - C11	Steatite	
Phases			
Place name			
Excavation	Found in 1883.		
Description			

Pottery	None
Bone obj	None
Steatite	Oblong vessel
Iron	None
Copper	None
Clay	None
Stone	None
Other	
Plant	None
Bone	None
Other	
Status	Burial?
Association	
Survival	Erosion rate
Refs.	
NMR/SMR	OR 1243 Figure

Gazetteer no. *71*

Site name *Links of Skaill*

Category Burial — Island Mainland
Location HY 229 187 — Parish Sandwick
Aspect Coastal — Facing W — Nearest landing place 0
Date C8 - C11 — Finds
Phases
Place name ON skáli = hall
Excavation Found in 1888.
Description Associated eroding remains visible over 20m. A stone cist 1.8m long, 0.65m wide and 0.60m deep, containing a skeleton and orientated NW -

Pottery None
Bone obj Comb; comb case
Steatite None
Iron Knife; spearhead; rod; fragments; nails
Copper None
Clay None
Stone Black slate whetstone; stone disc
Other None
Plant None
Bone Comb; comb case
Other
Status
Association 63,78,138,153 — Erosion rate 1
Survival Finds: NMAS
Refs. RCAMS, 1946, no. 767
OFS no. 18
NMR/SMR OR 1247 — Figure

Gazetteer no. *72*

Site name *Finstown*

Category Burial — Island Mainland
Location HY 35 13 — Parish Firth
Aspect — Facing — Nearest landing place
Date C9 - C11 — Steatite
Phases
Place name
Excavation
Description Found in a cist grave.

Pottery
Bone obj
Steatite Two vessels
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association — Erosion rate
Survival Finds: CC, HMG
Refs. Shetelig, 1940, 84-6

NMR/SMR NMR HY31SE31 — Figure

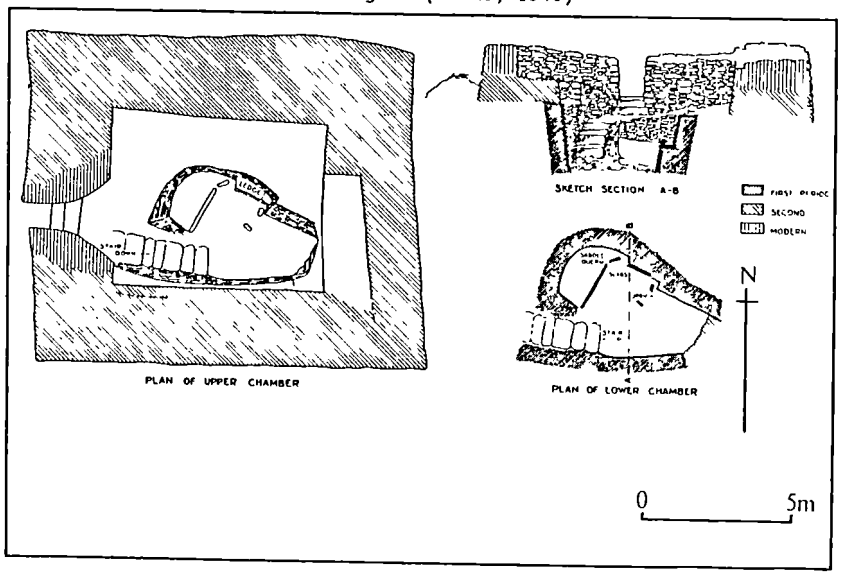
Gazetteer no. *73*

Site name *Castle Howe*

Category Defensive — Island Mainland
Location HY 5140 0033 — Parish Holm
Aspect Coastal — Facing S — Nearest landing place 50
Date C5 - C15 — Typ
Phases 2+
Place name ON kastala haugr = castle hill
Excavation RCAMS report, 1933; excavated prior to that.
Description Building is 9.7m x 7.9m.
A mound covering a dry stone construction of two superimposed chambers. The upper building is with walls about 2m thick.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 148
Survival Good — Erosion rate
Refs. RCAMS, 1946, no. 361

NMR/SMR OR 81 — Figure (RCAMS, 1946)



Gazetteer no. *74*

Site name *Oxtrow Broch*

Category Cemetery — Island Mainland
Location HY 2537 2678 — Parish Birsay
Aspect Inland — Facing — Nearest landing place 250
Date C5 - C11 — Finds
Phases
Place name
Excavation Excavated in 1866 by Mr. Leask of Boardhouse.
Description
Stone cists. There is, however, no indication of the context in which the finds apparently from were found.

Pottery Roman pottery
Bone obj Present
Steatite
Iron
Copper Ring-headed pin; Celtic? pennanular brooch
Clay
Stone
Other
Plant
Bone Present
Other
Status
Association
Survival Finds: NMAS — Erosion rate 0
Refs. RCAMS, 1946, no. 11
Hedges & Bell, 1987, 55-58
NMR/SMR OR 1675 — Figure

Gazetteer no. *75*

Site name *Earl's Palace*

Category Isolated find — Island Mainland
Location HY 248 279 — Parish Birsay
Aspect Coastal — Facing N — Nearest landing place 50
Date C9 - C11 — Finds
Phases
Place name
Excavation Found in 1863
Description

Pottery None
Bone obj None
Steatite None
Iron None
Copper Bronze ring-headed pin
Clay None
Stone None
Other None
Plant None
Bone None
Other
Status
Association 57,64,89,118,136,137,169,176
Survival Find: NMAS — Erosion rate 0
Refs.

NMR/SMR OR 1664 — Figure

Gazetteer no. *76*

Site name *Quoybanks*

Category Isolated find — Island Mainland
Location HY 451 101 — Parish St. Ola
Aspect Inland — Facing — Nearest landing place 1000
Date C9 - C11 — Find
Phases
Place name ON kvi
Excavation C19 find
Description

Described as "underground structures".

Pottery None
Bone obj None
Steatite None
Iron None
Copper Bronze pin
Clay None
Stone None
Other
Plant None
Bone None
Other
Status
Association
Survival Finds: HMG — Erosion rate 0
Refs.

NMR/SMR OR 1540 — Figure

Gazetteer no. 77

Site name *Stenness*

Category Burial — Island Mainland
Location HY 31 12 — Parish Stenness
Aspect — Facing — Nearest landing place
Date C9 - C11 — Finds
Phases
Place name
Excavation Found in 1902.
Description Inhumation lying immediately above the fragmentary remains of a building.

Pottery None
Bone obj None
Steatite None
Iron None
Copper Ring-headed pin
Clay None
Stone None
Other
Plant None
Bone None
Other
Status
Association
Survival Find: NMAS — Erosion rate
Refs. Shetelig, 1940, 170

NMR/SMR NMR HY31SE4 — Figure

Gazetteer no. 78

Site name *Skaill*

Category Isolated finds — Island Mainland
Location HY 23 18 — Parish Sandwick
Aspect Coastal — Facing NW — Nearest landing place 0
Date C9 - C11 — Finds
Phases
Place name ON skáli = hall
Excavation
Description

Pottery None
Bone obj None
Steatite Urn
Iron None
Copper None
Clay None
Stone None
Other Four beads; linen smoother
Plant None
Bone None
Other
Status
Association 63,71,138,153
Survival Finds; Skaill House — Erosion rate 1
Refs. Shetelig, 1940, 170-1

NMR/SMR NMR HY21SE13 — Figure

Gazetteer no. *79*

Site name *Greenigoe*

Category Burial — Island Mainland
Location HY 40 07 — Parish St. Ola
Aspect Inland — Facing — Nearest landing place 1000
Date C9 - C10 — Diagnostic finds
Phases
Place name
Excavation Found in 1889
Description

Cist grave. No skeleton reported.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other Two beads, one amber the other vitreous paste;
Plant
Bone
Other
Status
Association
Survival Finds: NMAS — Erosion rate 0
Refs. RCAMS, 1946, no. 509
Henshall, 1952, 17
NMR/SMR OR 1410 — Figure

Gazetteer no. *80*

Site name *Warebeth*

Category Cemetery — Island Mainland
Location HY 2374 0821 — Parish Stromness
Aspect Coastal — Facing SW — Nearest landing place 0
Date C5 - C11 — Typ; finds
Phases
Place name
Excavation Laing & Petrie, 1866; Bell & Dickson, 1980
Description

Broch with a possible Medieval cist graves cut into the upper levels.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival — Erosion rate 0.5
Refs. Bell & Dickson, 1989
NMR/SMR OR 1461 — Figure

Gazetteer no. *81*

Site name *Lavacroon*

Category Industrial
Location HY 3325 0447
Aspect Inland Facing
Date C9 - C15
Phases
Place name
Excavation Field survey Batey 1979-80; Johnson, 1989
Description Mound 30m x 26m a 1m high.
Stonework, shell midden and deposits of iron slag were found in fieldwalking. Geophysical survey presence of one circular and one recilinear

Island Mainland
Parish Orphir
Nearest landing place 250

Finds

Pottery Grass-tempered, locally produced; post-Medieval pot
Bone obj None
Steatite Two small fragments
Iron 18 nails; 2 rivet plates; staple; hook
Copper Rivet; disc
Clay None
Stone 11 whetstones; 2 flint scrapers; Norse ingot mould
Other 16 kg of iron slag; glass beads
Plant None
Bone None
Other Shellfish
Status Iron production site
Association 54,55,99,117
Survival Plough-damage
Refs. Batey, 1986; Johnson, 1990

Erosion rate

NMR/SMR NMR HY30SW4

Figure

Gazetteer no. *82*

Site name

Category Industrial
Location
Aspect Loch Facing
Date C10 - C15
Phases
Place name
Excavation Investigated in 1824 by Dr. Wood.
Description Mound 26m in diameter and 1.8m high.
A burnt mound over a clay-bonded structure, 3.6m x 3.6m, with a hearth at one end, a small cell to and a drain running from the hearth to the loch.

Island Sanday
Parish Cross & Burness
Nearest landing place

Pottery None
Bone obj None
Steatite None
Iron Nail in hearth
Copper None
Clay None
Stone Burnt stones
Other
Plant Burnt heather; ashes
Bone None
Other
Status ? Furnace
Association
Survival Unlocated
Refs. RCAMS, 1946, no. 165; Lamb, 1980, no. 161

Erosion rate

NMR/SMR OR 392

Figure

Gazetteer no. *83*
Site name *St. Peter's Kirk*

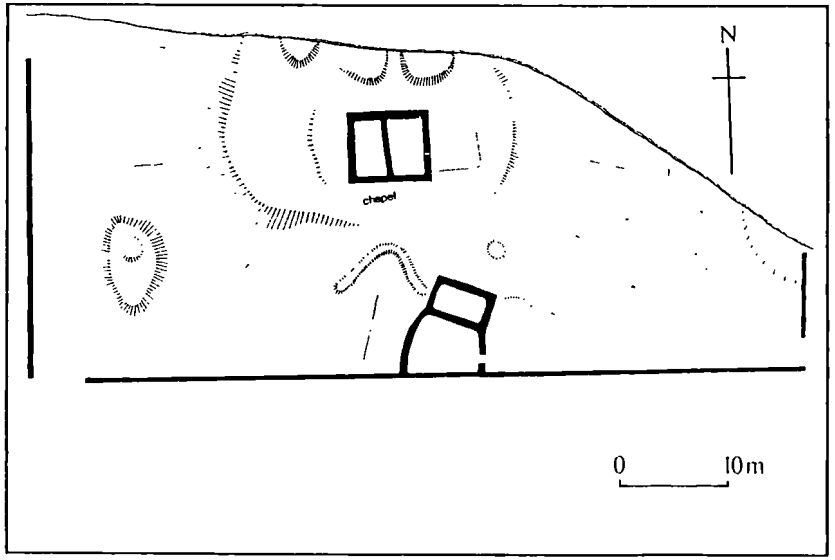
Category Chapel
Location HY 3375 2865
Aspect Coastal Facing NE
Date C13 Typ
Phases 2
Place name
Excavation None
Description

Rectangular nave and chancel. Nave is 7.85 x 6.7m and has been subdivided. Chancel is 4.7 x 5m The chancel arch is 1.4m wide.

Island Mainland
Parish Evie
Nearest landing place 5

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Sea erosion Erosion rate 0.2
Refs. RCAMS, 1946, no. 257

NMR/SMR OR 650 Figure (Lowe, 1987)



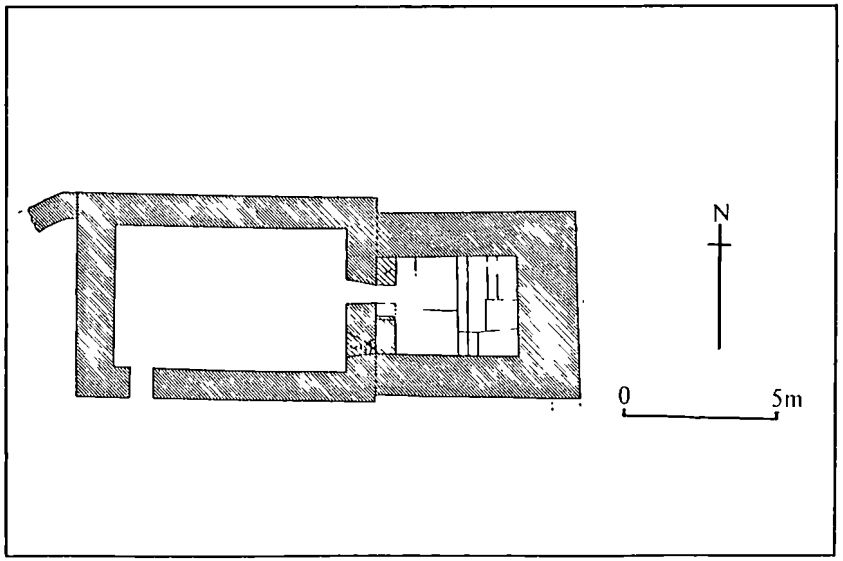
Gazetteer no. *84*
Site name *St. Thomas's*

Category Chapel
Location HY 424 209
Aspect Coastal Facing E
Date C12 - C13 Typ
Phases
Place name Locally called Tammaskirk.
Excavation Partially excavated by Storer-Clouston in 1931.
Description Chapel in churchyard c. 30m by 18m. Rectangular nave, 7 x 4.3m and a chancel 4.3m long and 3m wide.

Island Mainland
Parish Rendall
Nearest landing place 0

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Good Erosion rate
Refs. RCAMS, 1946, no. 258; Clouston, 1932

NMR/SMR OR 1765 Figure (Clouston, 1932)



Gazetteer no. *85*

Site name *Broch of Burgar*

Category	Burials	Island	Mainland
Location	HY 3523 2768	Parish	Evie
Aspect	Coastal Facing N	Nearest landing place	0
Date	C9 - C11 Typ; finds		
Phases			
Place name			
Excavation	Exploration by Peterkin 1825, later re-opened.		
Description	Mound 18.2m in diameter, 2.7m high. Two burials above broch.		

Pottery	Burials were in urns, not clear whether these were
Bone obj	
Steatite	See note under pottery.
Iron	
Copper	
Clay	
Stone	
Other	Amber beads; silver combs; six silver pins; silver
Plant	None
Bone	
Other	
Status	
Association	
Survival	Finds lost Erosion rate 0.3
Refs.	RCAMS, 1946, no. 261

NMR/SMR OR 639 Figure

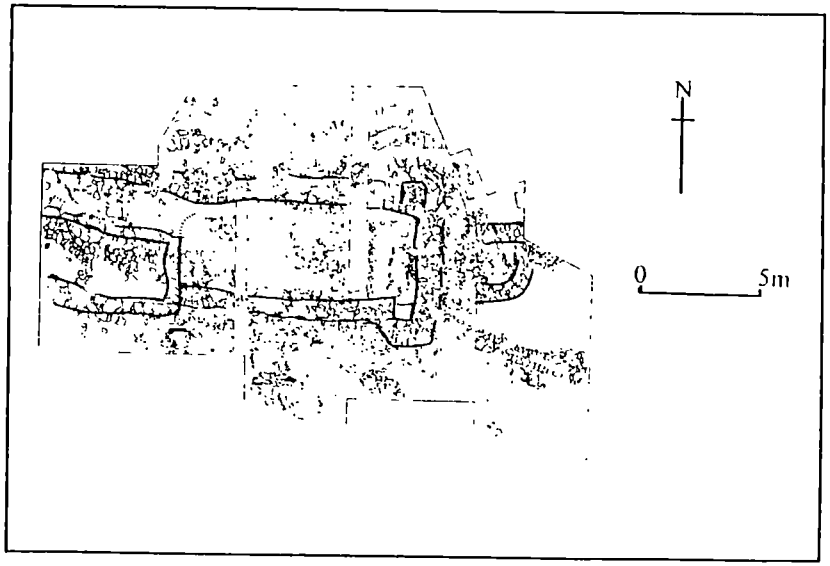
Gazetteer no. *86*

Site name *Beachview*

Category	Settlement	Island	Mainland
Location	HY 2478 2753	Parish	Birsay
Aspect	Coastal Facing W	Nearest landing place	0
Date	C9 - C15 Finds; typ; RC		
Phases	2+		
Place name	Name taken from the modern house.		
Excavation	Morris, 1978 (sites "Burnside" and "Studio").		
Description	Area c. 28 x 18m excavated. I E-W orientated rectilinear building, 12m long; II Byre with central drain, 7m long; Semi-circular drying kiln; III Small rectilinear structure.		

Pottery	Grass-tempered pot
Bone obj	Pin rough-out; comb
Steatite	Present
Iron	
Copper	Bronze chape for knife sheath
Clay	Burnt moulds
Stone	
Other	Silver wire
Plant	Barley; pine charcoal
Bone	Pin rough-out; comb
Other	Shellfish
Status	
Association	
Survival	Good Erosion rate 0.5
Refs.	Morris, 1983

NMR/SMR NMR HY22NW19 Figure (Morris, 1983)



Gazetteer no. *87*

Site name *Reeky Knowes*

Category Maritime structure — Island Mainland
Location HY 3873 2650 — Parish Evie
Aspect Coastal — Facing NE — Nearest landing place 25
Date
Phases
Place name Name means smoky mounds.
Excavation None
Description Four mounds, 3.6 - 13m diameter and up to 1m high Beacon mounds. In recent times these mounds have been used for signal fires to summon a boat.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Beacon stance
Association 46,47
Survival Good — Erosion rate
Refs. RCAMS, 1946, no. 276

NMR/SMR OR 1187 — Figure

Gazetteer no. *88*

Site name *Tingwall*

Category Thing — Island Mainland
Location HY 402 229 — Parish Evie
Aspect Coastal — Facing NE — Nearest landing place 0
Date C9 - C15 — Place-name; association
Phases
Place name ON Thing völlr = field of the assembly
Excavation None
Description Some structural remains visible, possible a broch.

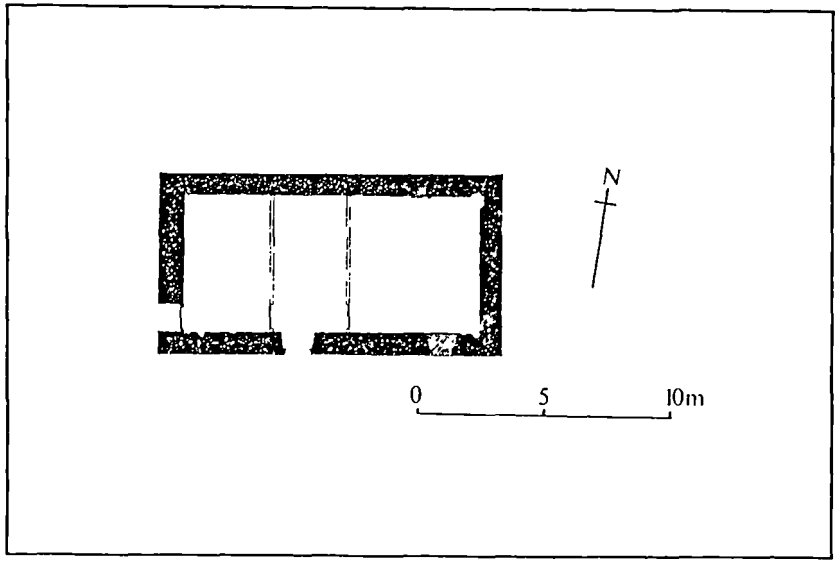
Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival — Erosion rate
Refs. RCAMS, 1946, no. 268

NMR/SMR OR 711 — Figure

Gazetteer no. *89*

Site name *St. Ola*

Category	Chapel	Island	Mainland
Location	HY 4510 1098	Parish	Kirkwall
Aspect	Coastal Facing N	Nearest landing place	50
Date	C11 - C18 Typ; documentary; finds		
Phases	3+ C11; C15; C16		
Place name	Also called St. Olav's Kirk		
Excavation	None. Planned by Dryden, 1855.		
Description	14 x 8m A C15 simple uni-cameral rectangular building, 14 by 7.8m with walls c. 1m thick. The original C11 may have been wooden.		
Pottery			
Bone obj			
Steatite			
Iron			
Copper			
Clay			
Stone	C11 type hogback tombstone		
Other			
Plant			
Bone			
Other			
Status	Parish church		
Association	57,64,75,89,118,136,137,157,169,171		
Survival	Partial	Erosion rate	0
Refs.	RCAMS, 1946, no. 400; Dietrichson & Meyer, 1906 Lang, 1974		
NMR/SMR	OR 1543	Figure	(Dietrichson & Meyer, 1906)



Gazetteer no. *90*

Site name *Linton Chapel*

Category	Chapel	Island	Shapinsay
Location	HY 5296 1863	Parish	Shapinsay
Aspect	Coastal Facing SE	Nearest landing place	100
Date	C12 - Typ		
Phases			
Place name	Dedicated to St. Catherine		
Excavation	None. Planned by Dryden 1846-51		
Description	9 x 4.15m Bicameral chapel. The nave measures 5.85 x 4.15m, the chancel is 2.5m long. Dry stone construction of lime stone render.		
Pottery			
Bone obj			
Steatite			
Iron			
Copper			
Clay			
Stone			
Other	Lime render		
Plant			
Bone			
Other			
Status			
Association			
Survival	Good	Erosion rate	
Refs.	RCAMS, 1946, no. 775; Lamb, 1987, no. 46 Dietrichson & Meyer, 1906		
NMR/SMR	OR 1055	Figure	

Gazetteer no. *91*

Site name *Damsay*

Category Defensive
Location HY 39 14
Aspect Coastal Facing N
Date C12 OS
Phases
Place name
Excavation None. Site not located.
Description

Described as astronghold in the OS, it apparently also had a drinking hall (chapters 66, 94 & 95).

Island Damsay
Parish Firth
Nearest landing place

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Not located
Refs. Clouston, 1932

Erosion rate

NMR/SMR NMR HY31SE25 Figure

Gazetteer no. *92*

Site name *Jupiter Fring*

Category Thing
Location HY 4132 2896
Aspect Inland Facing
Date C9 - C15
Phases
Place name Camp of Jupiter Fring; ON kambr = ridge
Excavation None. Name first recorded in 1880.
Description

None visible. It is not clear if there is a genuine tradition of a thing-stead or if this is simply an attempt to understand the site's

Island Rousay
Parish Rousay
Nearest landing place 1750
Place name; local tradition

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Good
Refs. RCAMS, 1946, no. 608; Lamb, 1982, nos 113 & 119

Erosion rate 0

NMR/SMR OR 552; OR 604 Figure

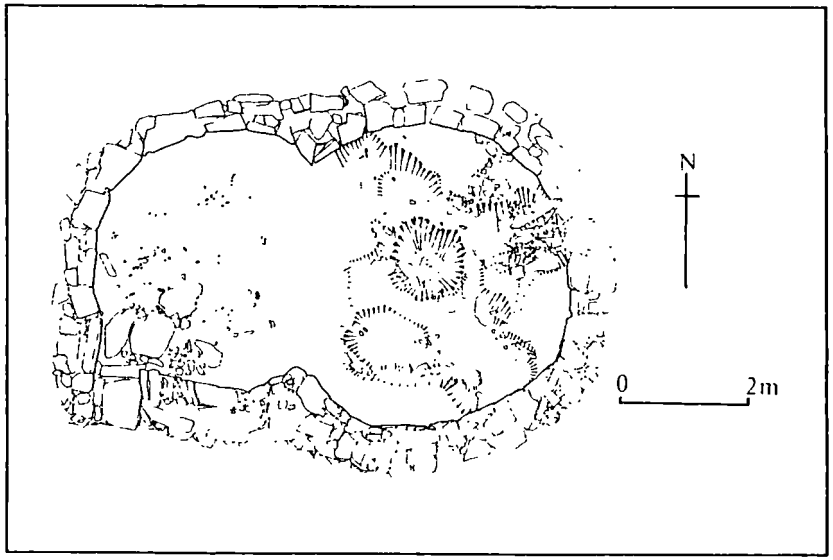
Gazetteer no. 93

Site name *Red Craig*

Category	Settlement	Island	Mainland
Location	HY 2448 2816	Parish	Birsay
Aspect	Coastal Facing W	Nearest landing place	0
Date	C8 - C10 Typ; RC		
Phases	4		
Place name	Local name for red sandstone cliff here.		
Excavation	Morris 1977-8 (Area 3)		
Description	Excavation area 12 x 6.7m. Elliptical stone structure with an internal figure of eight shape, two fire pits and a stone-lined		

Pottery	None
Bone obj	Pin; antler plate
Steatite	None
Iron	Knife; pin
Copper	None
Clay	Burnt clay
Stone	Gaming board; flints; whetstone; worked stone
Other	Fuel ash slag
Plant	Flax; barley; oats
Bone	Pin; antler plate
Other	Fish; shellfish
Status	
Association	
Survival	Good Erosion rate 0.5
Refs.	Morris, 1989

NMR/SMR NMR HY22NW15 Figure (Morris, 1989)



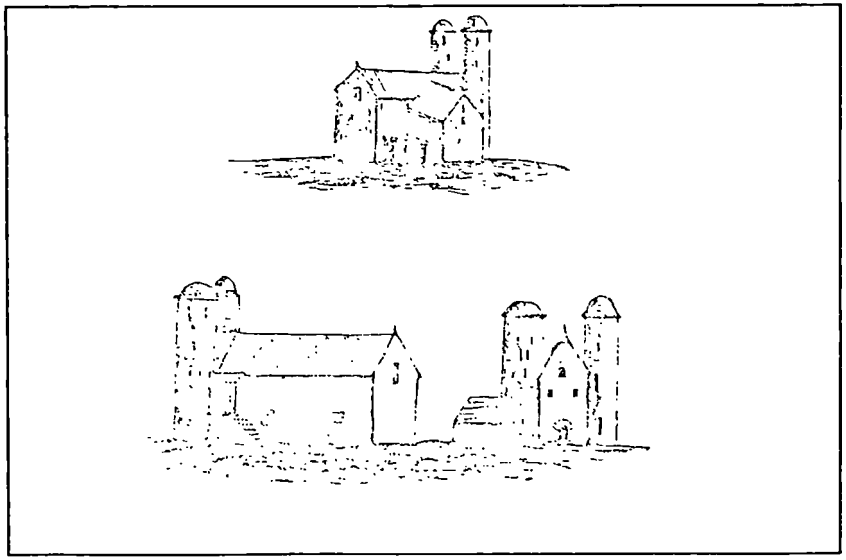
Gazetteer no. 94

Site name *Skaill*

Category	Chapel	Island	Mainland
Location	HY 5886 0636	Parish	Deerness
Aspect	Coastal Facing E	Nearest landing place	5
Date	C11 - C19 Hogback stone; typ		
Phases			
Place name	Dedicated to St. Mary.		
Excavation	None. Sketch by Low, 1774		
Description	A Romanesque church which had a vaulted chancel provided with an upper florr set between twin round towers.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	C11 - 12 type hogback tombstone in churchyard.
Other	2 coins
Plant	
Bone	
Other	
Status	
Association	39; 141
Survival	Erosion rate 0.5
Refs.	RCAMS, 1946, no. 622; Lamb, 1987, no. 156; Steedman, 1980, no. 39; OFS no. 23

NMR/SMR NMR HY50NE13 Figure (Low, 1774)

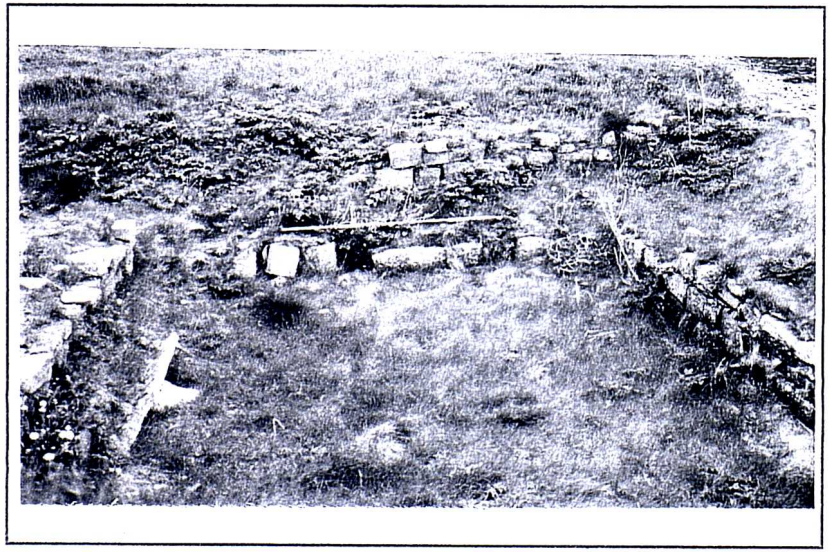


Gazetteer no. *95*

Site name *Newark*

Category	Chapel	**Island**	Mainland
Location	HY 5746 0413	**Parish**	Deerness
Aspect	Coastal **Facing** S	**Nearest landing place**	0
Date	C10 - C13	Coins	
Phases			
Place name			
Excavation	Dr. D. Brothwell 1969-72.		
Description	Remains visible along 100m of coast. Complex settlement remains and a graveyard associated with a medieval chapel.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	Coins below floor.
Plant	
Bone	
Other	
Status	
Association	96
Survival	Sea erosion **Erosion rate** 0.6
Refs.	RCAMS, 1946, no. 654; Lamb, 1987, no. 157 Steedman, 1980, nos. 48-9; Brothwell, 1977
NMR/SMR	OR 1176 **Figure** (Author)



Gazetteer no. *96*

Site name *Newark*

Category	Cemetery	**Island**	Mainland
Location	HY 5746 0413	**Parish**	Deerness
Aspect	Coastal **Facing** S	**Nearest landing place**	0
Date	C10	Association	
Phases			
Place name			
Excavation	Brothwell 1969-72; 2 further burials found in 1985		
Description	Site extends c. 100m along coast. Sequence of Norse burials.		

Pottery	
Bone obj	Comb
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	Comb
Other	
Status	
Association	95
Survival	Sea erosion **Erosion rate** 0.6
Refs.	RCAMS, 1946, no. 654; Lamb, 1987, no. 157 Steedman, 1980, nos. 48-9
NMR/SMR	OR 1176 **Figure**

Gazetteer no. *97*

Site name *Corn Holm*

Category Chapel
Location HY 6005 0173
Aspect Coastal Facing S
Date C10 - C15 Typ
Phases
Place name
Excavation Mooney 1920s
Description Mound 90m long.
A chapel 4.6m wide with walls 1.5m thick and associated buildings and a well (unexcavated).

Island Copinsay
Parish Deerness
Nearest landing place 0

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 98
Survival Good
Refs. RCAMS, 1946, no. 672; Lamb, 1987, no. 202; Mooney, 1926, 28; Lamb, 1973, gaz. no. 38.
NMR/SMR OR 1897

Erosion rate

Figure

Gazetteer no. *98*

Site name *Corn Holm*

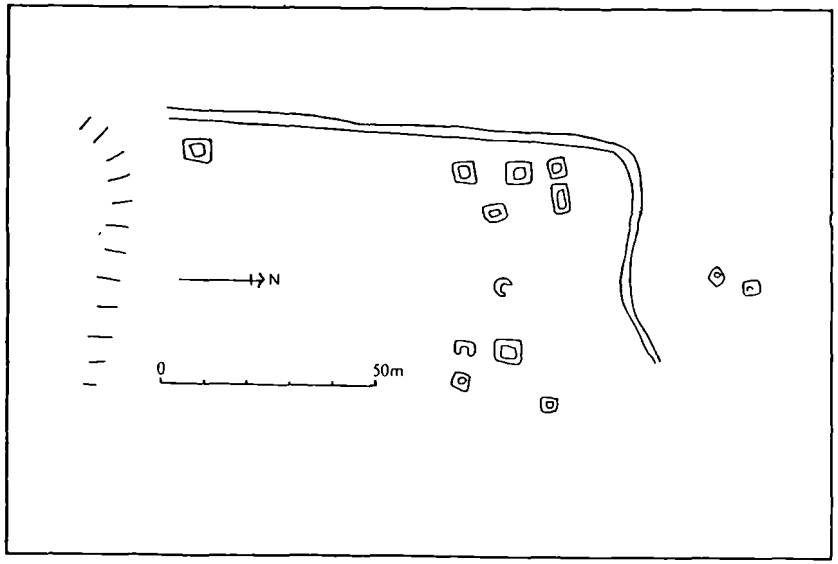
Category Monastery
Location HY 5972 0156
Aspect Coastal Facing S
Date C10 - C15 Typ
Phases
Place name
Excavation Mooney 1920s.
Description Remains over an area 13 x 6m.
14 rectangular and circular foundations measuring 6.4 - 7.3m by 5.5 - 6.4m or 4.5m in

Island Copinsay
Parish Deerness
Nearest landing place 0

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 97
Survival
Refs. RCAMS, 1946, no. 672; Lamb, 1987, no. 203
Lamb, 1976; Lamb, 1973, gaz. no. 38
NMR/SMR OR 1897

Erosion rate

Figure (Lamb, 1973)

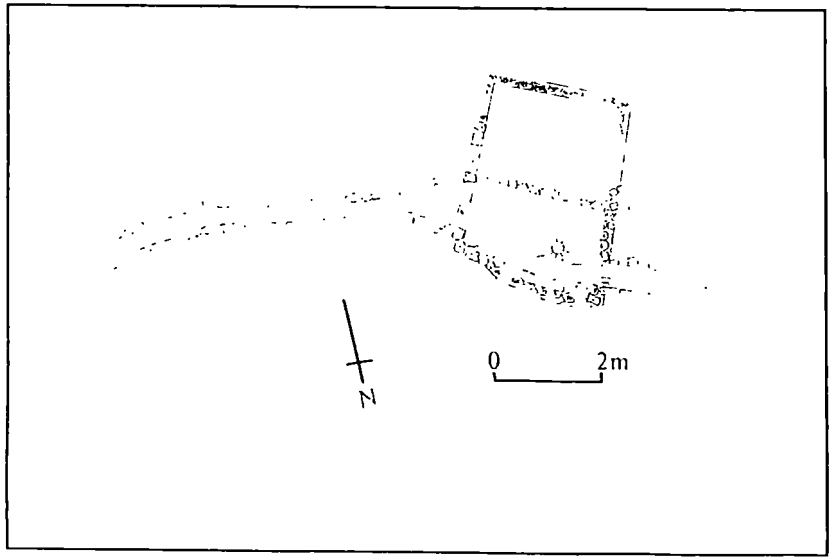


Gazetteer no. *99*
Site name *Earl's Bu*

Category	Industrial	Island	Mainland
Location	HY 3360 0447	Parish	Orphir
Aspect	Inland Facing	Nearest landing place	200
Date	C11 - C15 Finds; typ		
Phases			
Place name	Name taken from the adjacent site.		
Excavation	Batey & Morris, 1980s		
Description	c. 15m by 15m. A horizontal water-mill with associated headrace, underhouse remains, outfall opening, tail race and		

Pottery	Present
Bone obj	Combs; rune
Steatite	Vessel sherds; line sinker
Iron	None
Copper	None
Clay	None
Stone	None
Other	Beads
Plant	Heather; barley; flax; oats
Bone	Combs; rune
Other	pollack, haddock)
Status	Horizontal water-mill
Association	54,55,81,117, 152
Survival	Good Erosion rate
Refs.	Batey, 1992

NMR/SMR NMR HY30SW15 Figure (Batey, 1992)

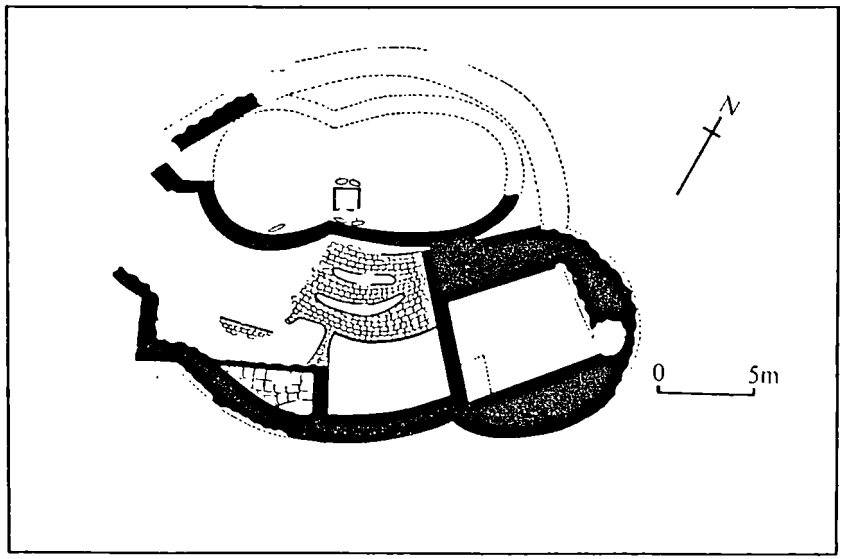


Gazetteer no. *100*
Site name *Nether Bigging*

Category	Defensive	Island	Mainland
Location	HY 3006 1192	Parish	Stenness
Aspect	Loch Facing N	Nearest landing place	0
Date	C12 - C15 Typ		
Phases			
Place name	Also called Gernaness and Clouston		
Excavation	Excavated 1924-5 by Clouston.		
Description	Peninsula c. 72 x 31m. Complex foundations, partly clay-bonded. A wall encloses two buildings, one a bathroom, the other an 8-shaped hall. A ditch isolates the peninsula.		

Pottery	One sherd of "broch" pottery
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	Hammerstones; burnt stones
Other	
Plant	
Bone	
Other	
Status	Seat of Hakon Klo
Association	
Survival	Good Erosion rate
Refs.	Clouston, 1926; Clouston, 1929

NMR/SMR OR 1391 Figure (Clouston, 1926)



Gazetteer no. *101*

Site name *Maeshowe*

Category Runes
Location HY 3180 1274
Aspect Inland Facing
Date C12
Phases
Place name Called Orkahaug in the OS.
Excavation Farrer, 1861; Childe, 1954-5; Renfrew, 1973-4
Description Mound 35m in diameter, 7m high.
Twenty-nine inscriptions on stones within the central chamber.

Island Mainland
Parish Stenness
Nearest landing place 500
Art style; OS

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone Urnes/Ringerike style engravings
Other
Plant
Bone
Other
Status
Association
Survival Good
Refs. RCAMS, 1946, no. 886

Erosion rate 0

NMR/SMR NMR HY31SW1 Figure

Gazetteer no. *102*

Site name *Brodgar farm*

Category Rune
Location HY 301 129
Aspect Loch Facing S
Date C12
Phases
Place name
Excavation Found early C20.
Description
The inscription was found on a block of sandstone in a field dyke.

Island Mainland
Parish Stenness
Nearest landing place 10
Art style

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Finds: NMAS
Refs. RCAMS, 1946, no. 903

Erosion rate 0

NMR/SMR OR 1367 Figure

Gazetteer no. *103*

Site name *Loch Stenness*

Category Rune
Location Island Mainland
Aspect Loch Facing
Parish Stenness
Nearest landing place
Date C12 Art style
Phases
Place name
Excavation Found early C20.
Description An oblong block with two twig runes.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Finds: NMAS Erosion rate
Refs. RCAMS, 1946, no. 904

NMR/SMR OR 1315 Figure

Gazetteer no. *104*

Site name *Broch of Stackrue*

Category Rune
Location HY 272 151
Aspect Loch Facing
Island Mainland
Parish Sandwick
Nearest landing place 200
Date C12 Art style
Phases
Place name
Excavation Found in 1881 during road construction.
Description The inscription is on a steatite disc from the broch.

Pottery
Bone obj
Steatite Disc, 5cm in diameter, 1.9cm thick.
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 67,119,166
Survival Erosion rate 0
Refs. Olsen, 1954

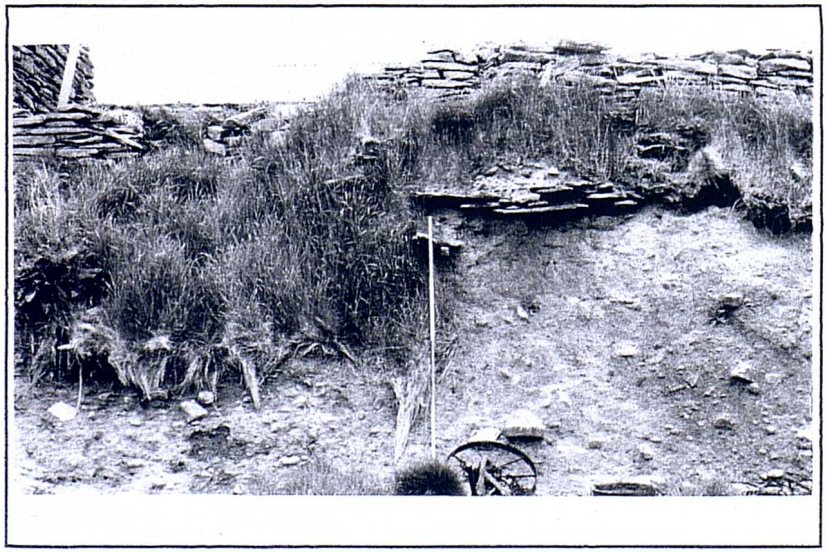
NMR/SMR OR 1270 Figure

Gazetteer no. *105*

Site name *Lower Dishes*

Category Settlement **Island** Stronsay
Location HY 6547 2342 **Parish** Stronsay
Aspect Coastal **Facing** SW **Nearest landing place** 0
Date C10 - C17 Typ
Phases
Place name
Excavation None
Description Remains visible eroding along 20m of coast. A derelict farmstead standing on a settlement mound. Dry stone structures are visible.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Sea erosion **Erosion rate** 0.3
Refs. RCAMS, 1946, no. 985; Lamb, 1987, no. 129
OFS no. 4
NMR/SMR OR 157 **Figure** (Author)



Gazetteer no. *106*

Site name *Cobbie Roo's Lade*

Category Maritime structure **Island** Stronsay
Location HY 6056 2157 **Parish** Stronsay
Aspect Coastal **Facing** W **Nearest landing place** 450
Date C12 - C15 Oral tradition; Place-name
Phases
Place name Lade = Scots term for load
Excavation None
Description

Two piles of large loose stones on an ayre of the same material. The load is traditionally said to dropped by Cobbie Row in building a bridge to

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Ballast site
Association 112
Survival Good **Erosion rate** 0
Refs. Lamb, 1987, no. 136

NMR/SMR OR 127 **Figure**

Gazetteer no. *107*

Site name *Ellibister*

Category Defensive **Island** Mainland
Location HY 385 211 **Parish** Rendall
Aspect Inland **Facing** **Nearest landing place** 3000
Date C12 - C15 Oral tradition
Phases
Place name ON bólstadr = farm settlement
Excavation None
Description

A heap of stones on a slight elevation is said to mark the site of an old castle.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone Worked stone
Other
Plant
Bone
Other
Status
Association
Survival **Erosion rate** 0
Refs. RCAMS, 1946, no. 303

NMR/SMR NMR HY32SE11 **Figure**

Gazetteer no. *108*

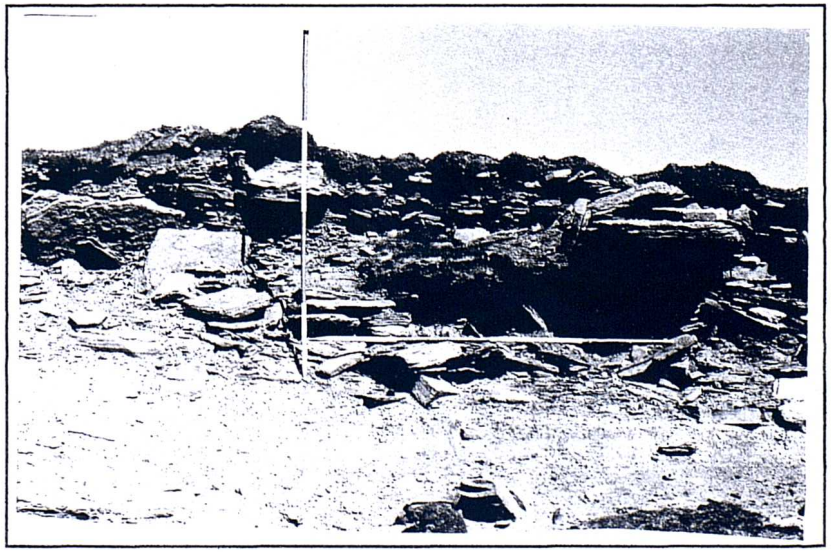
Site name *Sealskerry Bay*

Category Defensive **Island** Eday
Location HY 5305 3195 **Parish** Eday
Aspect Coastal **Facing** S **Nearest landing place** 0
Date C10 - C15 Finds
Phases
Place name Known locally as "the Castle".
Excavation None
Description

Irregular knoll with stonework and midden debris.

Pottery Medieval pot
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Sea erosion; Finds: NMAS **Erosion rate** 0.3
Refs. RCAMS, 1946, no. 240; Lamb, 1987, no. 34

NMR/SMR OR 736 **Figure** (Author)



Gazetteer no. *109*

Site name *Muckle Green Holm*

Category Settlement
Location HY 5265 2726 Island Eday
Aspect Coastal Facing W Parish Eday
Date C 10 - C15 Typ Nearest landing place 100
Phases
Place name Identified with OS Hellisey
Excavation None
Description Mound 24 x 27m, 1m high.
Rectilinear enclosures defined by low banks and containing improved ground.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status ?Monastic
Association
Survival Good Erosion rate 0
Refs. Lamb, 1987, no. 88

NMR/SMR OR 928 Figure

Gazetteer no. *110*

Site name *St. Mary's*

Category Chapel
Location HY 5680 3287 Island Eday
Aspect Coastal Facing E Parish Eday
Date C12 - C16 Finds; typ Nearest landing place 0
Phases 3+ C12/ C13/ C16
Place name ON skáli = hall
Excavation None. C19 report by Neale
Description

Ruinous parish church of Eday, a rare example of "first-pointed" style, with a chancel vaulted in and a bell tower.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone Incised cross-slab
Other
Plant
Bone
Other
Status
Association
Survival No trace of site Erosion rate
Refs. RCAMS, 1946, nos 209 & 238; Lamb, 1984, no. 49

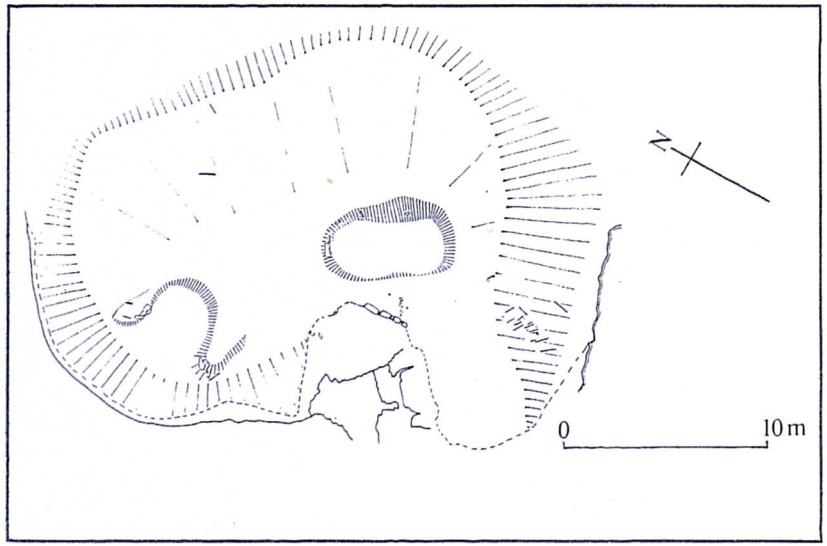
NMR/SMR OR 985 Figure

Gazetteer no. *111*

Site name *Peterkirk*

Category	Chapel	**Island**	Westray
Location	HY 4998 4008	**Parish**	Westray
Aspect	Coastal **Facing** W	**Nearest landing place**	0
Date	C12 - C15 Typ		
Phases	3		
Place name			
Excavation	None		
Description	Mound 25m across Chapel and graveyard evidently built on the site of an ancient drystone structure.		

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other Shellfish
Status
Association 122
Survival Sea erosion **Erosion rate** 0.3
Refs. RCAMS, 1946, no. 1031; Lamb, 1983, no. 153
OFS no. 6; Lowe, 1987, figure 15
NMR/SMR OR 724 **Figure** (Lowe, 1987)



Gazetteer no. *112*

Site name *Peatworth*

Category	Maritime structure	**Island**	Stronsay
Location	HY 606 221	**Parish**	Stronsay
Aspect	Coastal **Facing** W	**Nearest landing place**	0
Date	C10 - C17		
Phases			
Place name			
Excavation	None. Field visit by author 1993		
Description	Two mounds Two circular low mounds of rounded beach boulders. 1) 4.6 x 5m 2) 6 x 5.3m; max. height 0.80m.		

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Ballast site
Association 106
Survival Good **Erosion rate** 0
Refs. OFS no. 2

NMR/SMR None **Figure** (Author)

Gazetteer no. *113*

Site name *Ring of Brodgar*

Category	Rune	Island	Mainland
Location	HY 2945 1335	Parish	Stenness
Aspect	Loch Facing	Nearest landing place	300
Date	C12		
Phases			
Place name			
Excavation	Found early C20		
Description	Two runic inscriptions carved one on a broken monolith, the other on a boulder near the stone		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	
Association	
Survival	In situ
Refs.	Olsen, 1954

Erosion rate 0

NMR/SMR OR 1357 Figure

Gazetteer no. *114*

Site name *Bu of Burray*

Category	Bordland	Island	Burray
Location	ND 485 971	Parish	Burray
Aspect	Coastal Facing NE	Nearest landing place	0
Date	? - C16		
Phases		Rentals	
Place name	ON bú = farm		
Excavation	None		
Description			

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	
Association	62
Survival	
Refs.	Johnston, 1902; Peterkin, 1820

Erosion rate

NMR/SMR None Figure

Gazetteer no. *115*

Site name *Burwick*

Category Bordland
Location ND 438 842
Aspect Coastal Facing S
Date ? - C16
Phases
Place name ON bú vik = farm bay
Excavation None
Description

Island South Ronaldsay
Parish South Ronaldsay
Nearest landing place 0
Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Johnston, 1902; Peterkin, 1820

Erosion rate 0.3

NMR/SMR None

Figure

Gazetteer no. *116*

Site name *Bu of Hoy*

Category Bordland
Location HY 236 047
Aspect Coastal Facing E
Date ? - C16
Phases
Place name ON bú = farm; háey = high island
Excavation None
Description The whole island
Likely medieval settlement site was identified by the author and medieval iron extraction here is

Island Hoy
Parish Hoy
Nearest landing place 0
Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 150,151
Survival
Refs. Johnston, 1902; Peterkin, 1892

Erosion rate 0.9

NMR/SMR None

Figure

Gazetteer no. *117*

Site name *Bu of Orphir*

Category Bordland — Island Mainland
Location HY 33 04 & E — Parish Orphir
Aspect Coastal — Facing S — Nearest landing place 0
Date C12 - C16 — OS; Rentals
Phases
Place name Called Örfjara in OS
Excavation Flett, 1900-1; Batey & Morris, 1980s
Description Midland, Howth and Orakirk districts.
The Earl's Bu, Lavacroon industrial site, a Norse mill and the Round Church.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 54,55,81,99,152
Survival Good — Erosion rate 0.3
Refs. Johnston 1902; Peterkin, 1820

NMR/SMR OR 1426-7 — Figure

Gazetteer no. *118*

Site name *Kirkwall*

Category Bordland — Island Mainland
Location HY 45 10 — Parish Kirkwall
Aspect Coastal — Facing N — Nearest landing place 0
Date C11 - C20 — OS; Rentals
Phases
Place name ON Kirkju vágr = Church Bay
Excavation McGavin, 1978; Smith, 1980s
Description
St. Magnus' Cathedral; St. Ola's Church; Bishop's Palace; Caldale hoard.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 57,64,75,89,136,137,157,169,171,176
Survival — Erosion rate 0
Refs. Johnston, 1902; Peterkin, 1892

NMR/SMR OR — Figure

Gazetteer no. *119*

Site name *Nether Lyking*

Category Bordland
Location HY 27 15
Aspect Loch Facing S
Date ? - C16
Phases
Place name ON leik vin = games pasture
Excavation None
Description

A burial and an isolated find from a broch.

Island Mainland
Parish Sandwick
Nearest landing place 0
Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 67,104,166
Survival
Refs. Johnston, 1902; Peterkin, 1892

Erosion rate 0

NMR/SMR None

Figure

Gazetteer no. *120*

Site name *Swartmill*

Category Bordland
Location HY 47 45
Aspect Coastal Facing N
Date ? - C16
Phases
Place name
Excavation None
Description

Island Westray
Parish Westray
Nearest landing place 0
Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Johnston, 1902; Peterkin, 1892

Erosion rate

NMR/SMR None

Figure

Gazetteer no. *121*

Site name *Wasbuster*

Category	Bordland	Island Westray	
Location	HY 49 42	Parish Westray	
Aspect	Coastal	Facing	Nearest landing place 0
Date	? - C16	Rentals	
Phases			
Place name	OB bólstaðr = farm		
Excavation	None		
Description			

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	
Association	
Survival	
Refs.	Johnston, 1902; Peterkin, 1892
NMR/SMR	None

Erosion rate

Figure

Gazetteer no. *122*

Site name *Bu of Rapness*

Category	Bordland	Island Westray	
Location	HY 50 41	Parish Westray	
Aspect	Coastal	Facing SW	Nearest landing place 0
Date	C12 - C16	OS; Rentals	
Phases			
Place name	Called Hreppis-nes in OS; ON bú = farm		
Excavation	None		
Description	Peterkirk chapel		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	
Association	111
Survival	
Refs.	Johnston, 1902; Peterkin, 1892
NMR/SMR	OR 724

Erosion rate 0.3

Figure

Gazetteer no. *123*

Site name *Gryndleith*

Category Bordland
Location Island Sanday
Aspect Facing
Parish
Date C11 - C16 Nearest landing place
Phases OS; Rentals
Place name
Excavation None
Description

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Johnston, 1902; Peterkin, 1892 Erosion rate

NMR/SMR None Figure

Gazetteer no. *124*

Site name *Bús of Brough*

Category Bordland
Location HY 65 41 Island Sanday
Aspect Coastal Facing W Parish Cross & Burness
Date C11 - C16 Nearest landing place 0
Phases OS; Rentals
Place name ON bú = farm
Excavation
Description

Cemetery at Sties of Brough. There is a large farm mound immediately north of the farm buildings Westbrough, HY 6633 4235.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 012
Survival
Refs. Johnston, 1902; Peterkin, 1892 Erosion rate

NMR/SMR OR 321; 325-6 Figure

Gazetteer no. *125*

Site name *Halkisness*

Category Bordland
Location HY 61 34
Aspect Coastal Facing S
Date C11 - C16
Phases
Place name
Excavation None
Description

Island Sanday
Parish Cross & Burness
Nearest landing place 0
OS; Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Johnston, 1902; Peterkin, 1892

Erosion rate

NMR/SMR None

Figure

Gazetteer no. *126*

Site name *Tofts*

Category Bordland
Location HY 75 46
Aspect Coastal Facing N
Date C11 - C16
Phases
Place name ON topt = a house site
Excavation None
Description

There is a farm mound at HY 7475 4615 containing structures and midden.

Island Sanday
Parish Lady
Nearest landing place 0
OS; Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Johnston, 1902; Peterkin, 1892; Lamb, 1980, no. 92

Erosion rate

NMR/SMR OR 247

Figure

Gazetteer no. *127*

Site name *Tresness*

Category Bordland
Location HY 70 38
Aspect Coastal Facing
Date C12- C16 OS; Rntals
Phases
Place name ON tre nes = wood headland
Excavation None
Description

The Ordnance Survey recorded a local tradition that the farm house at Tresness at Hy 7037 3878 built on an ancient structure.

Island Sanday
Parish Cross & Burness
Nearest landing place 0

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Johnston, 1902; Peterkin, 1892; Lamb, 1980, no. 94

Erosion rate

NMR/SMR OR 149 Figure

Gazetteer no. *128*

Site name *Walls*

Category Bordland
Location HY 75 44
Aspect Coastal Facing S
Date C11 - C16 OS; Rentals
Phases
Place name ON vágr = bay
Excavation None
Description

Island Sanday
Parish Lady
Nearest landing place 0

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Johnston, 1902; Peterkin, 1892

Erosion rate

NMR/SMR None Figure n

Gazetteer no. *129*

Site name *Lop Ness*

Category Bordland
Location HY 76 43
Aspect Coastal Facing S
Date C11 - C16
Phases
Place name
Excavation None
Description

The farm at HY 7590 4368 occupies a mound where midden material up to 2m deep and much stonework eroding.

Island Sanday
Parish Lady
Nearest landing place 0
OS; Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other Shellfish
Status
Association
Survival
Erosion rate
Refs. Johnston, 1902; Peterkin, 1892; Lamb, 1980, no. 285

NMR/SMR OR 285 Figure

Gazetteer no. *130*

Site name *Holland*

Category Bordland
Location HY 66 22
Aspect Inland Facing
Date ? - C16
Phases
Place name
Excavation None
Description

Island Stronsay
Parish Stronsay
Nearest landing place 500
C16 rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Erosion rate
Refs. Johnston, 1902; Peterkin, 1892

NMR/SMR None Figure

Gazetteer no. *131*

Site name *Clestrain*

Category Bordland
Location HY 64 27
Aspect Inland Facing
Date ? - C16
Phases
Place name
Excavation None
Description

At 6349 2732 there is a settlement mound up to 7m wide. A deposit in the face of the bank is 1m extends for 45m, comprising drystone masonry.

Island Stronsay
Parish Stronsay
Nearest landing place 1000
Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Johnston, 1902; Peterkin, 1892; Lamb, 1984, no. 122

Erosion rate

NMR/SMR OR 1012 Figure

Gazetteer no. *132*

Site name *Musbuster*

Category Bordland
Location
Aspect Facing
Date ? - C16
Phases
Place name ON bólstaðr = farm; mosi = moss, bog
Excavation None
Description

Island Stronsay
Parish Stronsay
Nearest landing place
Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Johnston, 1902; Peterkin, 1892

Erosion rate

NMR/SMR None Figure

Gazetteer no. *133*

Site name *Papa Stronsay*

Category	Bordland	Island	Papa Stronsay
Location	HY 66 29	Parish	Stronsay
Aspect	Coastal Facing N	Nearest landing place	0
Date	C12 - C16 OS; Rentals		
Phases			
Place name	ON papa Strjónsey=monk;Strjón's isle		
Excavation	None		
Description	Whole island A farmstead is recorded here in the OS. The island itself was evidently an earldom possession. There are no identifiable remains.		
Pottery			
Bone obj			
Steatite			
Iron			
Copper			
Clay			
Stone			
Other			
Plant			
Bone			
Other			
Status			
Association			
Survival		Erosion rate	
Refs.	Johnston, 1902; Lamb, 1984, no. 226 OS chapter 29		
NMR/SMR	OR 175 Figure		

Gazetteer no. *134*

Site name *Tams Castle*

Category	Monastery	Island	Stronsay
Location	HY 6893 2341	Parish	Stronsay
Aspect	Coastal Facing E	Nearest landing place	0
Date	C10 - C15 Typ		
Phases			
Place name	A local name for the site.		
Excavation	None		
Description	A 17m high stack in the bay. Two enclosures, one containing the debris of a small building. Buildings are of drystone and rectangular in shape with walls 0.5 - 0.8m thick		
Pottery			
Bone obj			
Steatite			
Iron			
Copper			
Clay			
Stone			
Other			
Plant			
Bone			
Other			
Status	Hermitage		
Association			
Survival		Erosion rate	0
Refs.	Lamb, 1984, no. 157; Lamb, 1973, gaz. no. 46 Lamb, 1976		
NMR/SMR	OR 132 Figure		

Gazetteer no. *135*

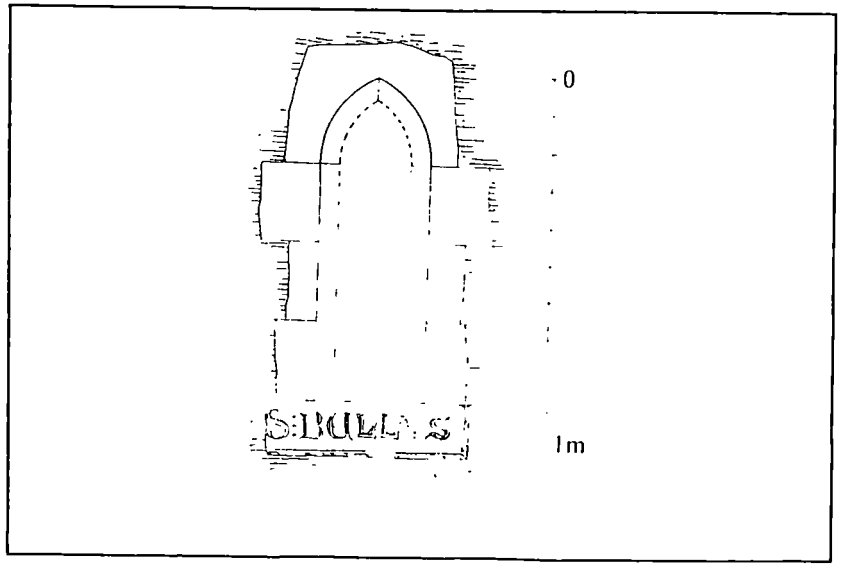
Site name *St. Magnus*

Category Chapel — Island Mainland
Location HY 2475 2765 — Parish Birsay
Aspect Coastal — Facing W — Nearest landing place 5
Date 1050 - C17 — OS; stratigraphy; typ; RC
Phases 4+ — eC1]/lrC11/C12/C13-15/C16-18
Place name This may be the Christchurch of the OS.
Excavation Barber, 1982
Description

I An unicameral building; II A bicameral church; III Church of nave and chancel form; IV/V Church cruciform plan was demolished in 1760. C13

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Good — Erosion rate 0.15
Refs. Barber, 1983

NMR/SMR OR 1666 — Figure (Dietrichson & Meyer, 1906)



Gazetteer no. *136*

Site name *Kirkwall*

Category Settlement / Thing — Island Mainland
Location HY 44 10 — Parish Kirkwall
Aspect Coastal — Facing N — Nearest landing place 0
Date C11 - C20 — OS; street plan
Phases
Place name ON Kirkju vágr = Church Bay
Excavation McGavin, 1978; Smith, 1980s
Description

Kirkwall was probably a market town by the C12 when the Bishopric moved there. It may also have Thing site. Residual medieval finds. Street plan

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Market town
Association 57,64,75,89,118,137,169,171,176,184
Survival Development threat — Erosion rate 0
Refs. McGavin, 1982; Gourlay & Turner, 1978

NMR/SMR NMR HY41SW43 — Figure

Gazetteer no. *137*

Site name *Kirkwall*

Category Bishop's Palace
Location HY 449 108 Island Mainland
Aspect Coastal Facing N Parish Kirkwall
Date C12 - C17 OS Nearest landing place 20
Phases 3+ C12/C15/C16/C17
Place name
Excavation None
Description

The extent of the original building has not been determined. What survives is post C15. The rebuilt in the late C15 and restored in the mid

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 57,64,75,89,118,136,157,169,171,176
Survival
Refs. RCAMS, 1946, no. 402; Ritchie & Ritchie, 1978, no. 28 Erosion rate 0

NMR/SMR OR 1563 Figure

Gazetteer no. *138*

Site name *Castle of Snusgar*

Category Defensive
Location HY 236 196 Island Mainland
Aspect Inland Facing Parish Sandwick
Date C9 - C15 Nearest landing place 350
Phases
Place name Local name for the site.
Excavation None
Description

Some remains were visible in 1795, and possibly into the last century, but there is nothing now to

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 63,71,78,153
Survival
Refs. RCAMS, 1946, no. 743 Erosion rate

NMR/SMR OR 1255 Figure

Gazetteer no. *139*

Site name *Colliness*

Category Chapel
Location HY 6850 4212
Aspect Coastal Facing N
Date C12 - C15 Typ; finds
Phases
Place name
Excavation None. C19 report.
Description
Unicameral building 3.7m long by 2.4m wide.

Island Sanday
Parish Cross & Burness
Nearest landing place 0

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone A cup and ring marked stone.
Other
Plant
Bone
Other
Status
Association 140
Survival Destroyed Erosion rate
Refs. RCAMS, 1946, no. 458; Lamb, 1980, no. 173

NMR/SMR OR 110 Figure

Gazetteer no. *140*

Site name *Colliness*

Category Cemetery
Location HY 6850 4212
Aspect Coastal Facing N
Date C9 - C11 Typ; finds
Phases
Place name
Excavation None. Chance C19 finds.
Description
A number of graves, all lined with flagstones.

Island Sanday
Parish Cross & Burness
Nearest landing place 0

Pottery
Bone obj
Steatite
Iron Spearhead
Copper
Clay
Stone Rough cross slab
Other Gold ring
Plant
Bone
Other
Status
Association 139
Survival Desroyed Erosion rate 0
Refs. RCAMS, 1946, no. 458; Lamb, 1980, no. 173

NMR/SMR OR 111 Figure

Gazetteer no. *141*

Site name *Sandside*

Category Settlement
Location HY 5914 0698 Island Mainland
Aspect Coastal Facing E Parish Deerness
Date C10 - C17 Typ Nearest landing place 0
Phases
Place name
Excavation None
Description

Beneath the ruins of an C18 laird's house the land owner has uncovered remains of C16 and some of have been found beneath the farmyard.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association 39,94
Survival
Erosion rate 0.2
Refs. RCAMS, 1946, no. 623; Lamb, 1987, no. 119; Steedman, 1980, no. 13
NMR/SMR NMR HY50NE34 Figure

Gazetteer no. *142*

Site name *Sebay*

Category Settlement
Location HY 52 05 Island Mainland
Aspect Coastal Facing N Parish St. Andrews
Date C10 - C15 OS Nearest landing place 10
Phases
Place name OS Flydrunes
Excavation None
Description

None visible. Clouston, 1927, has argued for the identification of the OS place name with Sebay an earldom property before 1460 but was not

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Seat ofThorstein
Association
Survival
Erosion rate
Refs. Lamb, 1987, no. 110; Clouston, 1927, 46 OS chapters 56, 66, 85
NMR/SMR OR 65 Figure

Gazetteer no. *143*

Site name *The Ward*

Category	Maritime structure	Island	Mainland
Location	HY 5689 0739	Parish	Deerness
Aspect	Inland	Facing	Nearest landing place 1350
Date	C10 - C15	Place-name	
Phases			
Place name	ON varða = beacon		
Excavation	None		
Description	23m x 14m x 2m high. A mound at the highest point of Deerness. This contained burnt earth and stones. This is beacon hearth.		
Pottery			
Bone obj			
Steatite			
Iron			
Copper			
Clay			
Stone			
Other			
Plant			
Bone			
Other			
Status	Beacon stance		
Association			
Survival	Good		Erosion rate
Refs.	Lamb, 1987, no. 185; Steedman, 1980, no. 22		
NMR/SMR	OR 1158	Figure	

Gazetteer no. *144*

Site name *Brough Deerness*

Category	Chapel	Island	Mainland
Location	HY 5957 0873	Parish	Deerness
Aspect	Coastal	Facing E	Nearest landing place 60
Date	C9 - C17	Typ; finds; stratigraphy	
Phases	3	pre C10;post C10;C16 - C19	
Place name	Bairns of Burgh ON boenhús = chapel		
Excavation	Morris, 1975-7		
Description	Excavation area 15 m squared. I Timber chapel with a ditch and fence enclosure. II Stone chapel and churchyard.		
Pottery	4 fabrics, handmade locally		
Bone obj			
Steatite			
Iron			
Copper			
Clay			
Stone			
Other	AS coin of Eadgar 959-975; clay pipes; C17 coins		
Plant			
Bone			
Other			
Status			
Association	40,145		
Survival			Erosion rate 0
Refs.	RCAMS, 1946, no. 621; Lamb, 1987, no. 153; Steedman, 1980, no. 8; Morris, 1987		
NMR/SMR	OR 1147	Figure (see 40)	

Gazetteer no. *145*

Site name *Brough Deerness*

Category	Cemetery	Island	Mainland
Location	HY 595 087	Parish	Deerness
Aspect	Coastal Facing E	Nearest landing place	60
Date	C9 - C15	Association; RC	
Phases			
Place name	see 144;ON dyrnes = deer headland		
Excavation	Morris, 1975-6		
Description	Phase I of chapel - 2 infant burials Phase II - 4 graves - 1 adult, 1 child, & 2		
Pottery			
Bone obj			
Steatite			
Iron	23 rivets; 8 nails		
Copper			
Clay			
Stone			
Other			
Plant			
Bone			
Other			
Status			
Association	40,144		
Survival		Erosion rate	0
Refs.	RCAMS, 1946, no. 621; Lamb, 1987, no. 153; Steedman, 1980, no. 8; Morris, 1987		
NMR/SMR	OR 1147 Figure		

Gazetteer no. *146*

Site name *Costa Hill*

Category	Maritime structure	Island	Mainland
Location	HY 3130 2912	Parish	Birsay
Aspect	Inland Facing	Nearest landing place	1000
Date			
Phases			
Place name	Known locally as a beacon stance.		
Excavation	None. Ordnance survey visit 1967.		
Description	Mound 12m diameter and 1.2m high. A well-shaped turf covered barrow on a false crest It has beeh dug into to discover a large quantity		
Pottery			
Bone obj			
Steatite			
Iron			
Copper			
Clay			
Stone			
Other			
Plant			
Bone			
Other	Ash		
Status	Beacon stance		
Association			
Survival	Good	Erosion rate	0
Refs.			
NMR/SMR	OR 1597 Figure		

Gazetteer no. *147*

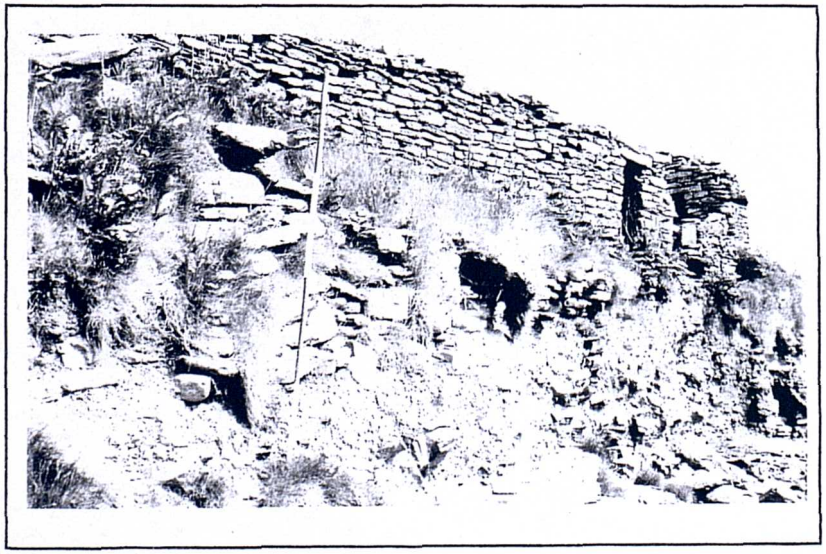
Site name *Saviskaill*

Category Settlement
Location HY 403 335
Aspect Coastal Facing N
Date C12 - C15
Phases
Place name ON skáli = hall
Excavation None. Recorded by Lamb, 1982.
Description Remains visible along 28m of coast.
Extensive eroding remains - drystone walls and midden material.

Island Rousay
Parish Rousay
Nearest landing place 0
Typ; place-name

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other Shellfish
Status
Association
Survival Sea erosion Erosion rate 0.5
Refs. Lamb, 1982, no. 83; OFS no. 35

NMR/SMR OR 480 Figure (Author)



Gazetteer no. *148*

Site name *Bu of Papil*

Category Settlement
Location HY 519 012
Aspect Coastal Facing S
Date C12 - C15
Phases
Place name Name taken from OS.
Excavation None
Description
None traced. Clouston, 1924 has judged the likely location of the site.

Island Mainland
Parish Holm
Nearest landing place
OS

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Bu farm
Association 73
Survival Erosion rate
Refs. Clouston, 1924; OS chapters 42, 44, 57

NMR/SMR OR 82 Figure

Gazetteer no. *149*

Site name *Bu of Cairston*

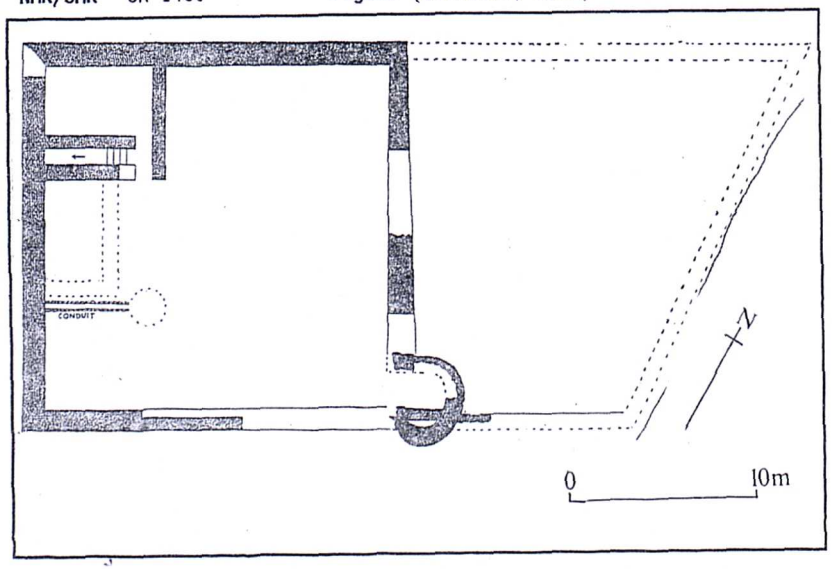
Category Defensive
Location HY 2725 0955
Aspect Coastal Facing E
Date C12 - C16
Phases 3 C12/ C16
Place name OS Kjarreks stödum; locally "the Castle"
Excavation 1927
Description Area c. 22 x 22m.
Clay bonded rubble walls forming a square building with sides c. 21m long. There are rooms built and W sides, a conduit, cistern and towers in the

Island Mainland
Parish Stromness
Nearest landing place 15
Typ; OS

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Castle
Association 172
Survival Good
Refs. RCAMS, 1946, no. 918; Clouston, 1929

Erosion rate

NMR/SMR OR 1466 Figure (Clouston, 1929)



Gazetteer no. *150*

Site name *Bu of Hoy*

Category Settlement
Location HY 235 047
Aspect Coastal Facing E
Date C10 - C15
Phases
Place name ON Haey = high island; bú = farm
Excavation None. Discovered by the author in field survey.
Description

A wall ten courses high is visible running for 6m has been exposed in the stream bank adjacent to Midden material is also visible.

Island Hoy
Parish Hoy
Nearest landing place 15
Association

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other Shellfish
Status Seat of Jon Wing, fief of Bordland
Association 116,151
Survival Good
Refs. OFS no. 15

Erosion rate 0

NMR/SMR OR 1915one Figure (Author)

Gazetteer no. *151*

Site name *Bay of Creekland*

Category Industrial — Island Hoy
Location HY 23 04 — Parish Hoy
Aspect Coastal — Facing E — Nearest landing place 0
Date C10 - C15/ C18 — Association; documentary
Phases
Place name
Excavation None
Description

A Crimean extraction site is located at HY 228 053 It is likely that there was extraction in the earlier, perhaps in the cliff.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Iron extraction site
Association 150; 116
Survival Sea erosion — Erosion rate 0.9
Refs. OFS no. 15; Wilson, 1935, 152

NMR/SMR None — Figure

Gazetteer no. *152*

Site name *Bu / Swanbister*

Category Isolated finds — Island Mainland
Location HY 3304-3505 — Parish Orphir
Aspect Inland — Facing — Nearest landing place 200
Date C9 - C15 — Finds
Phases
Place name ON bú = farm; bólstaðr = farm settlement
Excavation None
Description

Pottery
Bone obj
Steatite Present
Iron
Copper
Clay
Stone
Other Present but unspecified
Plant
Bone
Other
Status
Association 54,55,81,99,117
Survival
Refs. Morris, 1985, 223 — Erosion rate 0

NMR/SMR None — Figure

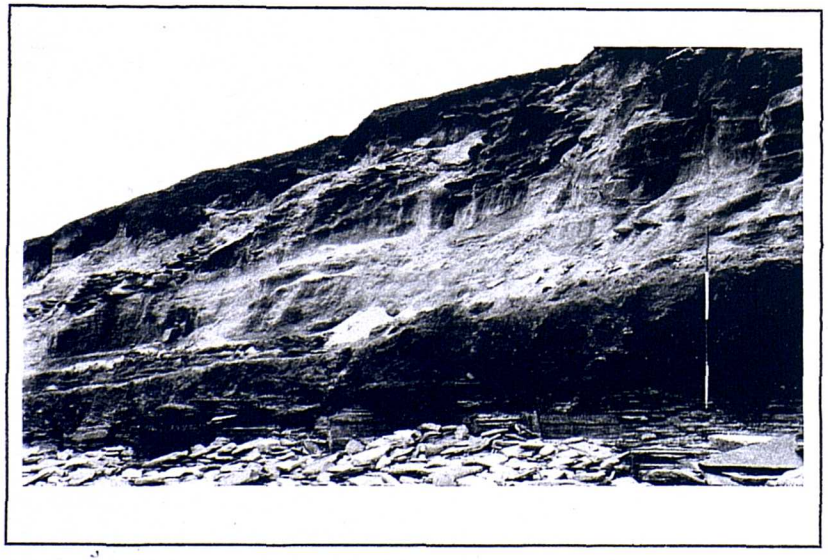
Gazetteer no. *153*

Site name *Bay of Skaill*

Category Settlement **Island** Mainland
Location HY 23 18 **Parish** Sandwick
Aspect Coastal **Facing** W **Nearest landing place** 0
Date C9 - C15 Association; stratigraphy
Phases
Place name ON skáli = hall
Excavation None. Survey by Morris, 1978-82.
Description Remains visible over 20m in cliff. Walling and midden material visible. These clearly span several phases.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Sea erosion **Erosion rate** 0.4
Refs. OFS no. 18; Morris, 1983

NMR/SMR NMR HY21NW30 **Figure** (Author)



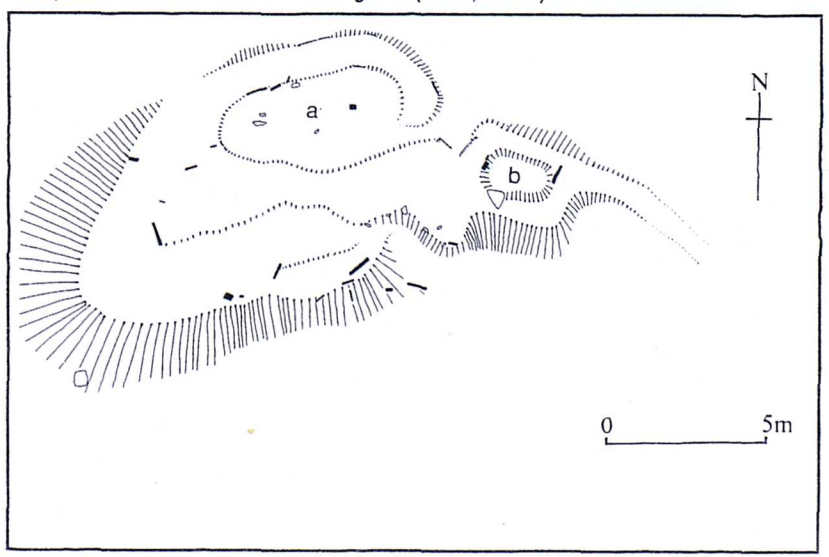
Gazetteer no. *154*

Site name *Knowe Burristae*

Category Settlement **Island** Westray
Location HY 4308 4295 **Parish** Westray
Aspect Coastal **Facing** W **Nearest landing place** 60
Date C9 - C15 Typ
Phases
Place name Local name for the adjacent broch site.
Excavation None
Description Area c. 6 x 4m. Rectilinear end wall of building visible as a low earthwork. It measures 3.7m wide internally and Adjacent there are linear earthworks, perhaps a

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Possibly prehistoric.
Association
Survival Good **Erosion rate** 0
Refs. RCAMS, 1946, no. 1070; Lamb, 1983, no. 111; OFS no. 7

NMR/SMR OR 722 **Figure** (Lowe, 1987)



Gazetteer no. *155*

Site name *Castle, Marwick*

Category Defensive
Location HY 233 246
Aspect Inland Facing
Date C9 - C15
Phases
Place name Local name for the site.
Excavation None
Description
A mound

Island Mainland
Parish Birsay
Nearest landing place 300
Association

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. RCAMS, 1946, Appendix, no. 1

Erosion rate

NMR/SMR OR 1710 Figure

Gazetteer no. *156*

Site name *Stenness Kirk*

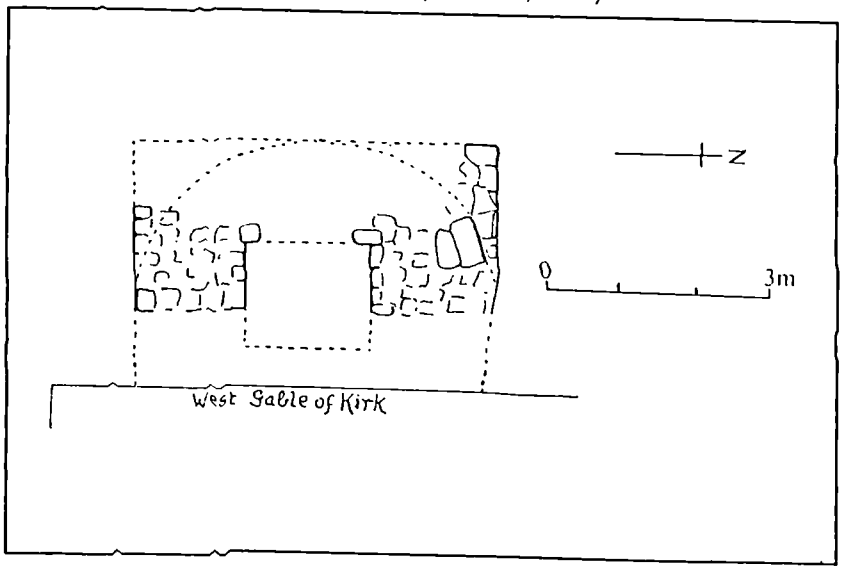
Category Defensive
Location HY 313 124
Aspect Loch Facing N
Date C12/ C15/ C18
Phases
Place name
Excavation Clouston, 1928; C18 description
Description Tower 4.7m by 3.4m.
Predecessor to present church had a tower at its west end with walls c. 1.5m thick. The adjoining was 7 x 4.8m. The tower was semi-circular on a

Island Mainland
Parish Stenness
Nearest landing place 60
Analogy;typ

Pottery
Bone obj
Steatite
Iron
Copper Two bronze brooches "of late date"
Clay
Stone Hogback stone.
Other
Plant
Bone
Other
Status
Association
Survival
Refs. RCAMS, 1946, no. 870; Morris, 1985; Clouston, 1929

Erosion rate 0

NMR/SMR OR 1376 Figure (Clouston, 1929)



Gazetteer no. *157*

Site name *Kirkwall*

Category Maritime structure — Island Mainland
Location HY 44 10 — Parish Kirkwall
Aspect Coastal — Facing N — Nearest landing place 0
Date C15 — Association
Phases
Place name ON kirkju vágr = Church Bay
Excavation Smith, 1980s
Description

Stone coarsed quayside.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Waterfront
Association 57,75,89,118,136-7,169,171,176
Survival Good — Erosion rate 0
Refs. Smith, 1986

NMR/SMR NMR HY41SW23 — Figure

Gazetteer no. *158*

Site name *Rendall*

Category Isolated find — Island Mainland
Location — Parish Rendall
Aspect — Facing — Nearest landing place
Date C12 — Typ
Phases
Place name
Excavation None. Find recorded in C18.
Description

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone Hogback
Other
Plant
Bone
Other
Status Chapel site?
Association
Survival Lost — Erosion rate
Refs. Lang, 1974

NMR/SMR None — Figure

Gazetteer no. *159*

Site name *St. Andrews*

Category Isolated find
Location
Aspect Facing
Date C9 - C11 Typ
Phases
Place name
Excavation None. Find from a bog in 1867.
Description

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other A hood found in a bog.
Plant
Bone
Other
Status
Association
Survival Finds: NMAS Erosion rate
Refs. Henshall, 1952

NMR/SMR OR 19 Figure

Gazetteer no. *160*

Site name *Howe Geo*

Category Settlement Island Mainland
Location HY 5852 0383 Parish Deerness
Aspect Coastal Facing S Nearest landing place 0
Date C10 - C15 Finds; typ
Phases
Place name ON haugr = hill
Excavation None
Description

Middens, burnt erath and walls standing up to 3 courses high are visible in section. On the mound is the outline of a building 17m x 4m

Pottery *Coarse medieval pottery*
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other Shellfish
Status
Association
Survival Finds: NMAS,THM; Sea erosion Erosion rate 0.3
Refs. Lamb, 1987, no. 111; Steedman, 1980, nos. 51-52

NMR/SMR OR 1141 Figure (Author)

Gazetteer no. *161*

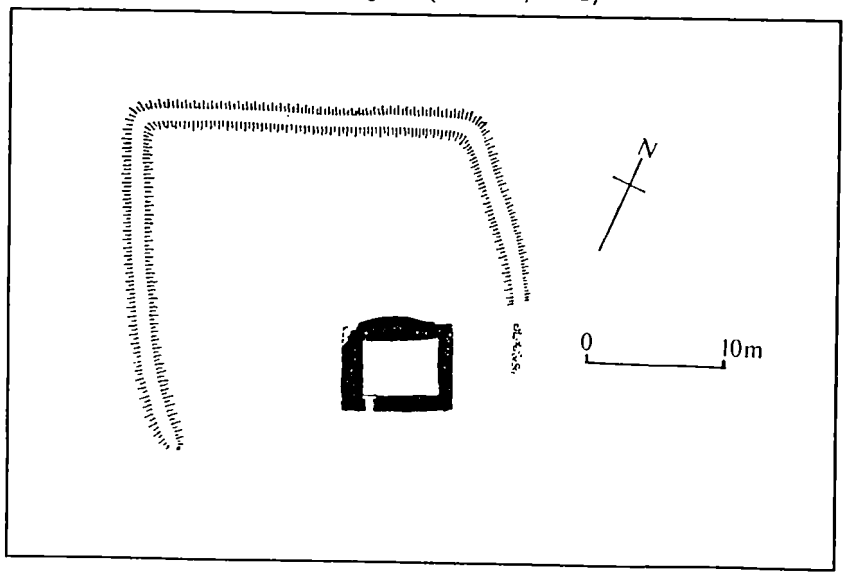
Site name *Marwick*

Category Chapel
Location HY 24 24
Aspect Coastal Facing W
Date C11 Typ
Phases
Place name ON vik = inlet
Excavation Storer-Clouston early this century.
Description Enclosed area covers 21m x 25m.
Rectangular structure 7.8m x 6.6m with walls 0.5m thick surviving to a height of 0.6m and of rubble matrix. An enclosure defined by a low mound

Island Mainland
Parish Birsay
Nearest landing place

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Urisland chapel
Association
Survival Good Erosion rate 0
Refs. RCAMS, 1946, no. 5; Radford, 1962, 180

NMR/SMR OR 1709 Figure (Radford, 1962)



Gazetteer no. *162*

Site name *Auskerry*

Category Monastery
Location HY 6768 1602
Aspect Coastal Facing SE
Date C8 - C11 Typ
Phases
Place name Locally called "Monkshouses".
Excavation None
Description

Rectangular building 4.7 x 3.6 internally with walls up to 0.9m thick, built of unbonded rubble. walls are visible protruding through grass near

Island Auskerry
Parish Stronsay
Nearest landing place 5

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Good Erosion rate
Refs. RCAMS, 1946, no. 1001; Lamb, 1984, no. 194
Lamb, 1976; Lamb, 1973, gaz. no. 44

NMR/SMR OR 930 Figure

Gazetteer no. *163*

Site name *Castle of Burwick*

Category Monastery
Location ND 435 843 Island South Ronaldsay
Aspect Coastal Facing W Parish South Ronaldsay
Date C8 - C11 Typ Nearest landing place 0
Phases
Place name ON borg = fort; vik = inlet
Excavation None
Description

Iron age multivallate promontory fort with an ill-defined row of oblong buildings visible nearby.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Good Erosion rate
Refs. Lamb, 1976

NMR/SMR OR 1872 Figure

Gazetteer no. *164*

Site name *Muckle Skerry*

Category Monastic
Location ND 46 78 Island South Ronalsay
Aspect Coastal Facing All Parish South Ronaldsay
Date C8 - C11 Typ Nearest landing place 0
Phases
Place name
Excavation None
Description

A large longhouse-like foundation is visible on Broti Ber. The footings of a rectilinear stone surrounded by possible oblong building remains lie

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Monastery
Association
Survival Good Erosion rate
Refs. Lamb, 1976, 153; Lamb, 1973, gaz. no. 29

NMR/SMR OR 496 Figure

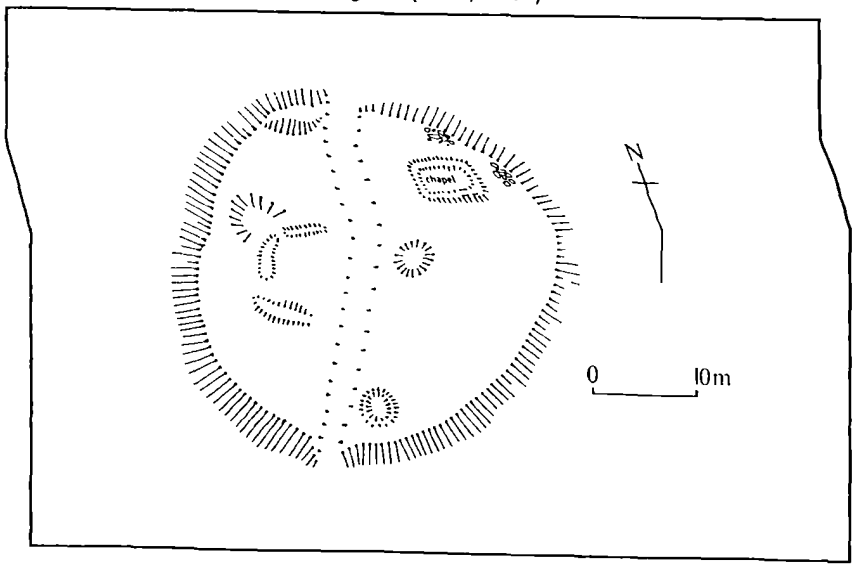
Gazetteer no. *165*

Site name *Huseby*

Category Chapel
Location HY 296 221 Island Mainland
Aspect Inland Facing Parish Birsay
Date C11 Nearest landing place 2750
Phases Analogy
Place name ON hùs = house; bú = farm
Excavation None
Description Enclosure 32m in diameter.
A curvilinear enclosure containing a chapel and its burial ground. The chapel measures 7m by externally.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Huseby site?
Association
Survival Good Erosion rate
Refs. RCAMS, 1946, no. 976; Lowe, 1987

NMR/SMR OR 1718 Figure (Lowe, 1987)



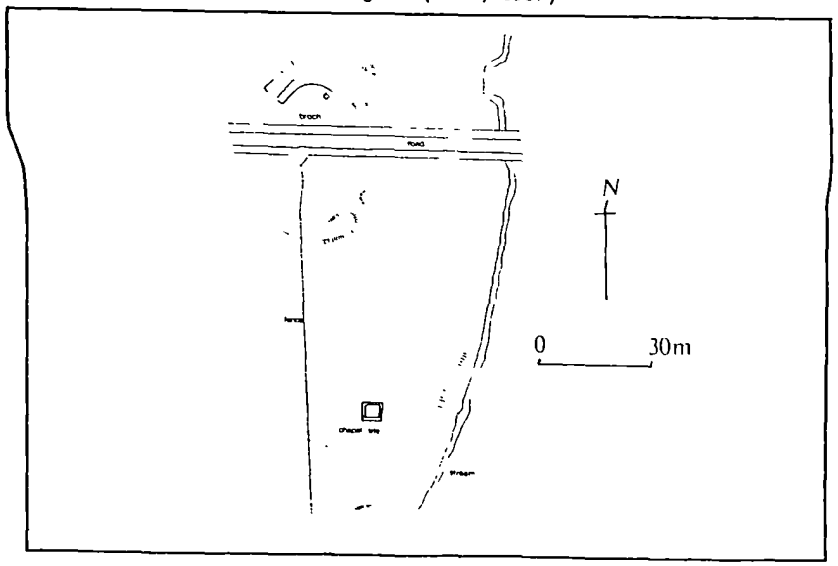
Gazetteer no. *166*

Site name *Lyking*

Category Chapel
Location HY 271 151 Island Mainland
Aspect Loch Facing S Parish Sandwick
Date C11 - C12 Nearest landing place 140
Phases Analogy
Place name ON leik vin = games pasture
Excavation None
Description Enclosure 40m by 20m
Chapel and burial ground defined by a rectilinear enclosure. The unicameral chapel measures 6m by

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Urisland chapel
Association 67,104,119
Survival Good Erosion rate 0
Refs. RCAMS, 1946, no. 738; Lowe, 1987

NMR/SMR OR 1271 Figure (Lowe, 1987)



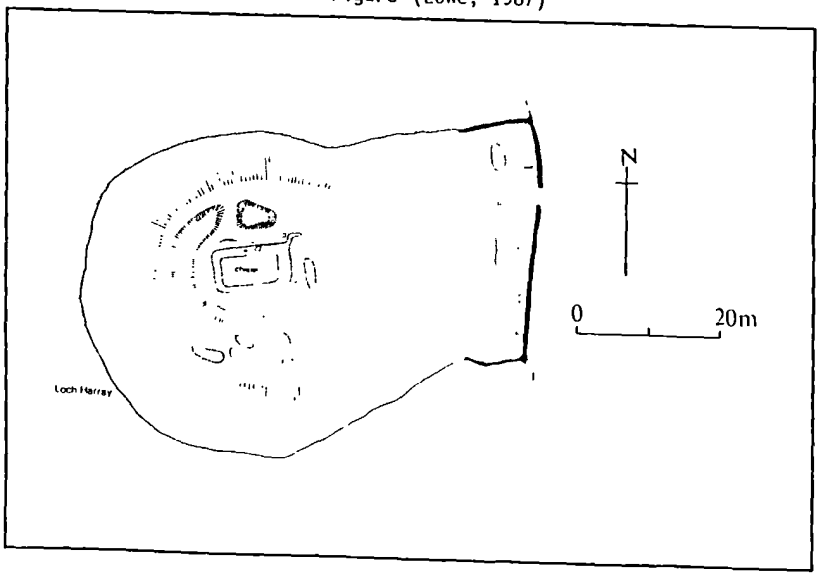
Gazetteer no. *167*

Site name *Marykirk*

Category Chapel
Location HY 295 179 Island Mainland
Aspect Loch Facing N Parish Harray
Date C11 Nearest landing place 20
Phases Analogy
Place name Local name for the site.
Excavation None
Description Over area 30m in diameter
Chapel and burial ground on a loch promontory cut off by a bank at its eatsern end. The unicameral measures 10m by 6m.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Urisland chapel
Association
Survival Good
Refs. RCAMS, 1946, no. 132; Lowe, 1987 Erosion rate 0

NMR/SMR OR 1599 Figure (Lowe, 1987)



Gazetteer no. *168*

Site name *Tuquoy*

Category Maritime structure Island Westray
Location HY 455 431 Parish Westray
Aspect Coastal Facing S Nearest landing place 0
Date C10 - C15 Typ; association
Phases
Place name ON tufa = mound kvi = enclosure
Excavation Recorded during survey in 1988.
Description 2.7m by 1.9m
A boat shaped structure, eroded to the south.
Poorly constructed with single-faced walls.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Boat naust
Association 21,25
Survival Sea erosion
Refs. Owen, 1988, 8 Erosion rate 2

NMR/SMR OR 710 Figure

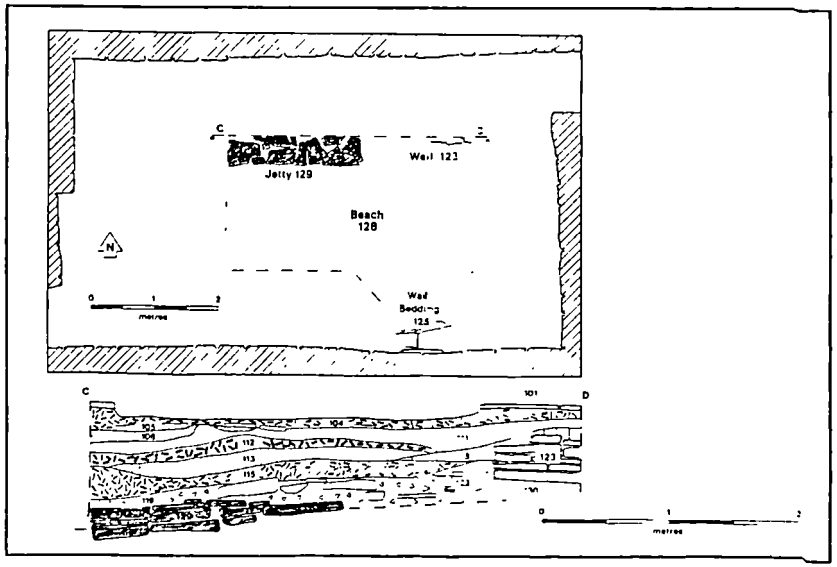
Gazetteer no. *169*

Site name *Kirkwall*

Category	Maritime structure	Island	Mainland
Location	HY 44 10	Parish	Kirkwall
Aspect	Coastal Facing N	Nearest landing place	0
Date	C12 - C13	Association; Local tradition	
Phases			
Place name	ON kirkju vágr = Church bay		
Excavation	1978 McGavin		
Description	Trench measured 4m by 2m. A hard comprising redeposited masonry off-cuts of imported Eday red sandstone. Sloping 1:20. Also comprising a coursed grey flagstone wall,		

Pottery	None
Bone obj	None
Steatite	None
Iron	None
Copper	None
Clay	None
Stone	Hone; architectural fragments; worked stone
Other	None
Plant	None
Bone	None
Other	Shellfish
Status	Hard and jetty
Association	57,64,75,89,118,136-7,157,171,176
Survival	Good Erosion rate 0
Refs.	McGavin, 1982

NMR/SMR OR 1552 Figure (McGavin, 1982)



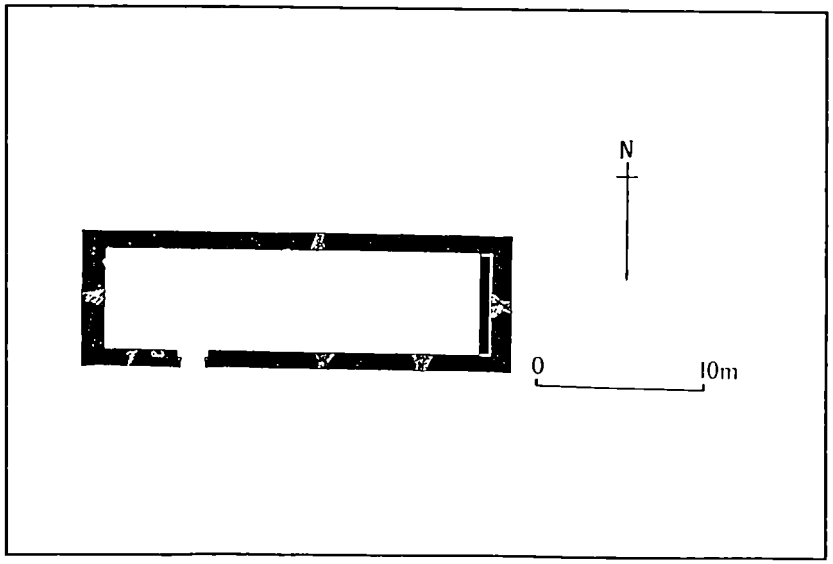
Gazetteer no. *170*

Site name *Westside*

Category	Chapel	Island	Rousay
Location	HY 3735 3018	Parish	Rousay
Aspect	Coastal Facing SW	Nearest landing place	35
Date	C13 - C19 Typ		
Phases	3		
Place name	Also St. Mary's, Westness and Swandro		
Excavation	None		
Description	A unicameral rectangular building with associated churchyard in which 032 is situated.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	Architectural fragments
Other	
Plant	
Bone	
Other	
Status	Parish church
Association	27-32
Survival	Good Erosion rate 0.5
Refs.	RCAMS, 1946, no. 548; Lamb, 198 , no. 111

NMR/SMR OR 487 Figure (Dietrichson & Meyer, 1906)



Gazetteer no. *171*

Site name *King's Castle*

Category Defensive — Island Mainland
Location HY 4490 1095 — Parish Kirkwall
Aspect Coastal — Facing N — Nearest landing place 15
Date 1380-1614 — Historical
Phases
Place name
Excavation None
Description

Built on the site of the old hall of the Norse Earls by Earl Sinclair. Stone-built, with "thick" A well still exists beneath Castle Street.

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Castle
Association 57,75,89,136-7,157,169,176
Survival Destroyed — Erosion rate
Refs. Hossack, 1900

NMR/SMR OR 1557 — Figure

Gazetteer no. *172*

Site name *Bu of Cairston*

Category Bordland — Island Mainland
Location HY 273 10 — Parish Stromness
Aspect Coastal — Facing E — Nearest landing place 15
Date ? - C16 — Rentals
Phases
Place name Called Bull of Karftane in the rental.
Excavation At site 149
Description

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Bordland
Association 149
Survival — Erosion rate
Refs. Peterkin, 1820

NMR/SMR OR 1466 — Figure

Gazetteer no. *173*

Site name *Walls*

Category Bordland
Location ND 33 89
Aspect Coastal Facing
Date ? - C16
Phases
Place name Island Walls
Excavation Parish Walls
Description The whole island was apparently once earldom land.
Nearest landing place
Rentals

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status Bordland
Association 36
Survival
Refs. Peterkin, 1820

Erosion rate

NMR/SMR None Figure

Gazetteer no. *174*

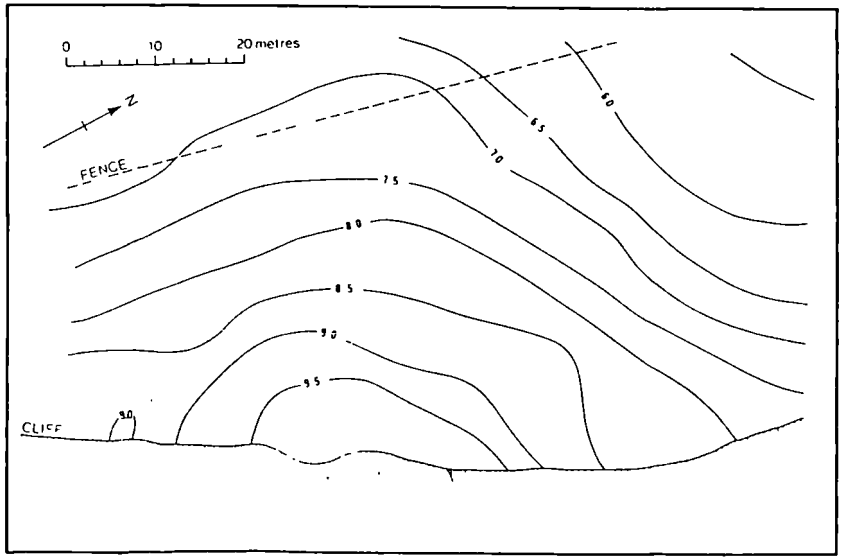
Site name *Langskaill*

Category Settlement
Location HY 684 444
Aspect Coastal Facing E
Date ?C13 RC
Phases
Place name Island Sanday
Excavation Parish Cross & Burness
Description Surveyed and sampled by Lamb et al 1980s.
About 40m in diameter and 4m high.
Flagstone floor and occupation surfaces nearby.
Nearest landing place 0

Pottery None
Bone obj None
Steatite None
Iron None
Copper None
Clay None
Stone None
Other
Plant Charcoal
Bone None
Other Shellfish
Status Farm mound
Association
Survival Sea erosion
Refs. Davidson et al, 1986

Erosion rate 0.5

NMR/SMR OR 386 Figure (Davidson et al, 1986)



Gazetteer no. *175*

Site name *Brettaness*

Category	Settlement	Island	Rousay
Location	HY 397 332	Parish	Rousay
Aspect	Loch	Facing	Nearest landing place 0
Date	C5 - C11	Finds; TL dates	
Phases	3+	Iron Age/ Pictish/ Medieval	
Place name			
Excavation	Marwick, 1980s		
Description	Peninsula 30m in diameter, 1.7m high. Man made mound; occupation debris; wall footings and lime plaster from chapel; corbelled cellular buildings; clay-lined kiln		

Pottery	Iron Age and Pictish pottery; crucibles; mould
Bone obj	Hipped bone pins; whalebone objects
Steatite	None
Iron	None
Copper	None
Clay	None
Stone	None
Other	
Plant	None
Bone	Hipped bone pins; whalebone objects
Other	
Status	Crannog; chapel
Association	
Survival	Good Erosion rate 0
Refs.	Marwick, 1984

NMR/SMR OR 468 Figure

Gazetteer no. *176*

Site name *Kirkwall*

Category	Isolated find	Island	Mainland
Location	HY44 10	Parish	Kirkwall
Aspect	Coastal	Facing N	Nearest landing place
Date	C9 - 11	Typ	
Phases			
Place name			
Excavation	Found in the 19th century.		
Description			

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	Bead
Other	
Plant	
Bone	
Other	
Status	
Association	57,64,75,89,118,137,157,169,171
Survival	Erosion rate 0
Refs.	Shetelig, 1940, 170

NMR/SMR NMR HY41SW23 Figure

Gazetteer no. *177*

Site name *Lea Shun*

Category Isolated find
Location HY 660 212
Aspect Coastal Facing S
Date C9 - C18 Typ
Phases
Place name
Excavation Found in the 20th century
Description A logboat. In 1926 it survived to 4.2m long, 0.73m wide and 0.13m deep.

Island Stronsay
Parish Stronsay
Nearest landing place 50

Pottery
Bone obj
Steatite
Iron Patched with square-sectioned iron nails
Copper
Clay
Stone
Other Wooden boat
Plant
Bone
Other
Status Logboat
Association
Survival Destroyed; photos in NMAS Erosion rate 0
Refs. Lamb, 1984, No. 165

NMR/SMR OR 436 Figure

Gazetteer no. *178*

Site name *Marwick*

Category Settlement
Location HY 228 239
Aspect Coastal Facing W
Date C9 - C11 Typ
Phases
Place name ON vik = bay
Excavation
Description Viking houses

Island Mainland
Parish Birsay
Nearest landing place 50

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival Scheduled monument no. 2884 Erosion rate 0
Refs.

NMR/SMR NMR HY22SW30 Figure

Gazetteer no. *179*

Site name *Old Manse*

Category	Cemetery	Island	Westray
Location	HY 437 427	Parish	Westray
Aspect	Coastal Facing SE	Nearest landing place	10
Date	C9 - C15 Typ		
Phases			
Place name			
Excavation	Found in the 18th century		
Description	Two graves, one small and one set within a circle of stones.		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	
Other	
Plant	
Bone	
Other	
Status	
Association	
Survival	Lost Erosion rate
Refs.	RCAMS, 1946, no. 1046; Lamb, 1983, no. 170

NMR/SMR OR 763 Figure

Gazetteer no. *180*

Site name *Skaill*

Category	Cemetery	Island	Westray
Location	HY 4567 5217	Parish	Westray
Aspect	Inland Facing	Nearest landing place	300
Date	C9- C15 Typ		
Phases			
Place name	ON skali = hall		
Excavation	Discovered during construction in 1935		
Description	An old building and cist burials		

Pottery	
Bone obj	
Steatite	
Iron	
Copper	
Clay	
Stone	Burnt stones
Other	
Plant	
Bone	
Other	Shellfish
Status	
Association	
Survival	Destroyed Erosion rate
Refs.	Lamb, 1983, no. 144

NMR/SMR OR 686 Figure

Gazetteer no. *181*

Site name *Lyking*

Category Burial
Location HY 500 022
Aspect Inland Facing
Date C9 - C11 Typ
Phases
Place name ON leik vin = playing area
Excavation
Description

Viking grave

Island Mainland
Parish Holm
Nearest landing place 1000

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs.

Erosion rate

NMR/SMR NMR HY50SW17 Figure

Gazetteer no. *182*

Site name *Runthall*

Category Settlement
Location HY 6240 2961
Aspect Coastal Facing N
Date 0 Finds
Phases
Place name
Excavation None. Discovered in 1989.
Description

Floor and shell scatter visible in eroding shore.

Island Stronsay
Parish Stronsay
Nearest landing place 0

Pottery 3 medieval sherds
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant Charcoal
Bone
Other Shellfish
Status
Association
Survival Finds: THM
Refs. Lynn & Bell, 1989

Erosion rate

NMR/SMR Figure

Gazetteer no. *183*

Site name *Burray*

Category Isolated find
Location ND 47 96
Aspect Facing
Date C9 - C11 Typ
Phases
Place name
Excavation
Description

Island Burray
Parish Burray
Nearest landing place

Pottery
Bone obj
Steatite
Iron
Copper Bronze pin
Clay
Stone
Other
Plant
Bone
Other
Status
Association
Survival
Refs. Shetelig, 1940, 169

Erosion rate

NMR/SMR NMR ND49NE4 Figure

Gazetteer no. *184*

Site name *Langskaill*

Category Settlement
Location HY 4342 2203
Aspect Coastal Facing S
Date C12 - C16
Phases
Place name
Excavation None
Description A roughly rectangular mound, 11m by 15.5m by 0.6m. The possible foundations of a building. Earthworks.

Island Gairsay
Parish Evie & Rendall
Nearest landing place 100

Pottery
Bone obj
Steatite
Iron
Copper
Clay
Stone
Other
Plant
Bone
Other Shellfish
Status
Association
Survival Scheduled monument.
Refs. RCAMS, 1946, no. 316

Erosion rate 0

NMR/SMR NMR HY42SW7 Figure

Appendix 2 - Radiocarbon dates of gazetteer sites

Data collected until September 1994

Gaz. no.	Site	Lab. ref.	Context	Material	Uncal. date	Cal date	Cal date 1 sigma	Ref.
						(Clarke, 1976)	(Stuiver &	
							Reimer, 1986)	
1	Pool, Sanday	GU 1998			1505 +/- 50 bp		AD 531-608	Hunter, 1993
1		GU 2004			1270 +/- 55 bp		AD 671-788	
1		GU 1810			1270 +/- 50 bp		AD 673-786	
1		GU 2002			1250 +/- 50 bp		AD 681-852	
1		GU 2003			1185 +/- 50 bp		AD 778-893	
1		GU 2241			1160 +/- 50 bp		AD 789-954	
1		GU 2006			1160 +/- 50 bp		AD 789-954	
1		GU 1807			1105 +/- 70 bp		AD 882-1004	
1		GU 2005			1090 +/- 50 bp		AD 891-1000	
21	Tuquoy, Westray	GU 1650	Pit	Dung/straw/ash	885 +/- 65 bp		AD 1034-1225	Owen, 1989
27	Westness, Rousay	TRDL		Human bone	Not published			Pers. comm.
40	Brough of Deerness	GU 1558	Phase B1-2	Charcoal & bone	1220+/-90 bp		AD 677-894	Morris, 1987
40		GU 1574	Phase C2		920+/-65 bp		AD 1023-1192	
45	Scar, Burness							
51	Brough of Birsay	GU 1251	Area IV, E	Charcoal	1380+/-55 bp	AD 615 +/- 75	AD 625-671	Morris, 1985
51		GU 1252	Area IV, E	Charcoal	1280+/-50 bp	AD 700 +/- 70	AD 669-782	
51		GU 1253	Area IV, E	Charcoal	1260+/-50 bp	AD 715 +/- 70	AD 677-790	
51		GU 1254	Area IV, N. of E	Charcoal	1275+/-50 bp	AD 705 +/- 70	AD 671-783	
51		GU 1318	Area IV, N. of E	Charcoal	1260+/050 bp	AD715 +/- 70	AD 677-790	
51		GU 1319	Area I, S	Seaweed/charcoal	1155+/-55 bp	AD 810 +/- 75	AD 789-961	
51		GU 1192	Area I, N	Charcoal	1135+/-55 bp	AD 835 +/- 75	AD 828-975	
51		GU 1194	Area I, N	Charcoal	1200+/-85 bp	AD 760 +/- 100	AD 687-946	
51		GU 1229	Room 5, ph. 2b	Charcoal	1305+/-55 bp	AD 680 +/- 75	AD 660-773	
51		GU 1193	Room 5, ph. 3a	Charcoal	995+/-60 bp	AD 995 +/- 80	AD 987-1041	
51		GU 1391	Area 8, ph 3	Willow	915 +/- 95 bp	AD 1058 +/- 95	AD 1015-1225	Hunter, 1986
51		GU 1394	Area 8, ph 3	Willow	975 +/- 60 bp	AD 1010 +/- 60	AD 1003-1155	
51		GU 1573	Area 9, ph 2.2	Pine	995 +/- 60 bp	AD 994 +/- 60	AD 987-1041	
51		HAR2083	Area 7, ph 2.2	Willow	1000 +/- 70 bp	AD 990 +/- 70	AD 979-1113	

Appendix 2 - Radiocarbon dates of gazetteer sites

Gaz. no.	Site	Lab. ref.	Context	Material	Uncal. date	Cal date	Cal date 1 sigma	Ref.
						(Clarke, 1976)	(Stuiver & Reimer, 1986)	
51		HAR2079	Area 7, ph 2.2	Willow	1020 +/- 70 bp	AD 974 +/- 70	AD 968-1035	
51		HAR2078	Area 7, ph 2.2	Willow	1040 +/- 70 bp	AD 958 +/- 70	AD 900-1027	
51		GU 1392	Area 8, ph 3	Willow	1040 +/- 65 bp	AD 958 +/- 65	AD 956-1026	
51		GU 1571	Area 9, ph 2.1	Willow	1045 +/- 80 bp	AD 954 +/- 80	AD 895-1029	
51		GU 1572	Area 9, ph 2.2	Pine	1050 +/- 60 bp	AD 950 +/- 60	AD 900-1021	
51		GU 1570	Area 9, ph 2.2	Pine	1075 +/- 60 bp	AD 912 +/- 60	AD 893-1014	
51		HAR2743	Area 7, ph 1	Willow	1140 +/- 70 bp	AD 828 +/- 80	AD 789-980	
51		HAR2755	Area 7, ph 1	Willow	1150 +/- 80 bp	AD 815 +/- 80	AD 780-980	
51		HAR2742	Area 7, ph 1	Willow	1150 +/- 70 bp	AD 815 +/- 70	AD 785-975	
51		GU 1597	Area 9, ph 1	Willow	1195 +/- 60 bp	AD 765 +/- 60	AD 728-893	
51		GU 1598	Area 9, ph 1	Willow	1250 +/- 90 bp	AD 720 +/- 90	AD 666-886	
51		GU 1599	Area 9, ph 1	Willow	1280 +/- 60 bp	AD 640 +/- 60	AD 1279-1395	
51		HAR2751	Area 7, ph 1	Willow	1350 +/- 60 bp	AD 640 +/- 60	AD 641-686	
56	S. of Redcraig, Area 1	GU 1552	Skeleton 1	Human bone	1040 +/- 60 bp	AD 958 +/- 60	AD 960-1024	Morris, 1989
56		GU 1553	Skeleton 2	Human bone	1240 +/- 85 bp	AD 728 +/- 60	AD 671-887	
56		GU 1554	Skeleton 3	Human bone	1705 +/- 80 bp	AD 276 +/- 80	AD 235-419	
56		GU 1956	Midden D	Mammal bone	1250 +/- 55 bp	AD 720 +/- 55	AD 679-856	
56		GU 1957	Midden D	Mammal bone	1105 +/- 55 bp	AD 873 +/- 55	AD 886-991	
56		GU 1979	Sand, F1	Mammal bone	1215 +/- 80 bp	AD 748 +/- 80	AD 683-893	
59	Saevar Howe, Birsay	GU 1402	Phase 2a	Charcoal	1260 +/- 60 bp	AD 715 +/- 78	AD 673-852	Hedges,
59		GU 1400	Phase 2b	Charcoal	1200 +/- 90 bp	AD 760 +/- 90	AD 685-953	
59		GU 1401	Phase 2c	Fish, shell & bone	1395 +/- 60 bp	AD 600 +/- 78	AD 606-668	
60	S. of Redcraig, Area 2	GU 1555	Skeleton1 D	Human bone	1140 +/- 65 bp	AD 828 +/- 65	AD 797-978	Morris, 1989
60		GU 1667	Midden C	Seed	975 +/- 110 bp	AD 955 +/- 110	AD 970-1170	
60		GU 1955	Sand A	Mammal bone	1230 +/- 50 bp	AD 736 +/- 50	AD 689-881	
60		GU 1980	Midden C2	Mammal bone	1095+/-55bp	AD 887 +/- 55	AD 889-999	
61	Sandside, Graemsay	GU 1067	Skeleton	Human bone	865+/-55 bp	AD 1140 +/- 75	AD 1047-1237	Morris, 1985
86	Beachview, Birsay	GU 2278	Area 1, Y	Bone	940 +/- 50 bp		AD 1020-1159	

Appendix 2 - Radiocarbon dates of gazetteer sites

Gaz. no.	Site	Lab. ref.	Context	Material	Uncal. date	Cal date	Cal date 1 sigma	Ref.
						(Clarke, 1976)	(Stuiver &	
							Reimer, 1986)	
86	Beachview, Birsay	GU 1191	Area 1, S	Seed	930 +/- 55 bp		AD 1021-1187	
86		GU 2272	Area D/E, Q	Bone	960 +/- 50 bp		AD 1001-1155	
86		GU 2275	Area 1, Y	Bone	890 +/- 50 bp		AD 1004-1260	
86		GU 2277	Area 1, S	Bone	920 +/- 50 bp		AD 1024-1189	
86		GU 2269	Area D/E, W	Bone	850 +/- 60 bp		AD 1068-1258	
86		GU 2268	Area D/E, S	Bone	850 +/- 50 bp		AD 1074-1256	
86		GU 2281	Area 2, X	Bone	850 +/- 50 bp		AD 1074-1256	
86		GU 2280	Area 2, W	Bone	820 +/- 80 bp		AD 1131-1277	
86		GU 2279	Area 3, X	Bone	800 +/- 90 bp		AD 1158-1280	
86		GU 2270	Area D/E,U	Bone	770 +/- 120 bp		AD 1160-1376	
86		GU 2273	Area 1, R	Bone	790 +/- 50 bp		AD 1210-1277	
86		GU 2276	Area 1, V	Bone	760 +/- 50 bp		AD 1222-1280	
86		GU 2274	Area 1, S	Bone	750 +/- 50 bp		AD 1226-1281	
93	Redcraig, Area 3	GU 1230	Phase A	Seed	1060 +/- 60 bp	AD 936 +/- 60	AD 897-1018	Morris, 1989
93		GU 1958	Room B, ph. C	Seed	1250 +/- 110 bp	AD 720 +/- 110	AD 670-880	
93		GU 1959	Phase A	Seed	1240 +/- 110 bp	AD 728 +/- 110	AD 680-880	
135	St. Magnus, Birsay			Human bone	1120+/-50 bp		AD 881-984	
174	Langskaill, Sanday	GU 2352	1.65m	Soil	820 +/- 80 bp		AD 1040-1280	Davidson et al, 1986
174		GU 2353	1.65m	Shell	1000 +/- 70 bp		AD 1290-1430	
174		GU 2354	1.85m	Soil	1010 +/- 60 bp		AD 1280-1420	
174		GU 2355	2.62m	Soil	910 +/- 50 bp		AD 1020-1210	
174		GU 2356	2.62m	Shell	650 +/- 70 bp		AD 1280-1400	
174		GU 2357	3.25m	Charcoal	1190 +/- 90 bp		AD 690-980	
174		GU 2358	3.25m	Soil	1010 +/- 70 bp		AD 980-1150	
174		GU 2359	3.25m	Shell	1110 +/- 60 bp		AD 1260-1390	
174		GU 2360	4.05m	Shell	1170 +/- 50 bp		AD 1220-1280	

Abbreviations: BMC = Keary, CF, & Grueber, MA, 1887-93, Catalogue of English coins in the British Museum. Anglo-Saxon series. London. British Museum.

Sylloge = Stevenson, RBK, 1966 Sylloge of coins of the British Isles. National Museum of Antiquities of Scotland. Edinburgh. Part I Anglo-Saxon coins with associated foreign coins. London. British Academy.

North = North, JJ, 1994 English Hammered Coinage. Volume 1. Early Anglo-Saxon to Henry III c. 600 - 1272. London. Spink & Son. BM = British Museum g = grammes; gr = grains

Gaz. no	Site	Coin description	Date	Moneyer	Mint	Type (BMC)	North / Sylloge	Weight	Treatment	Ref.
144	Brough of Deerness	Penny of Eadgar	959-975	Grith	Lincoln/Stamford	Type 1	no. 741	Not given	Chipped	Morris, 1986, 339-41
58	Saevar Howe	Penny of Burgred	866-868	Tata	?	Type d	no. 426	Not given	Pierced	Hedges, 1983, 93-4
49	Buckquoy	Halfpenny of Edmund	940-6	(Bald)win	NW	Type 1	no. 688	Not given	Cut	Ritchie, 1977
62	North Town Moss	Penny of Eadwig	955-9	Boia	N/S hampton	Type ii	no. 727	14.8 gr	Whole	RCAMS, 1946
		Penny of Eadgar	959-975	Ive	NE	Type i	no. 741	10.1 gr	Chipped	Stevenson, 1966, xviii
		3 pennies of Aethelred II	978-1016	Oeoeeip; Ludes; Goda	York; ?; London	Type iia	nos. 766; 773	11.5; 7.4; 25.9 gr	2 cut; 1 whole	Dolley, 1966, no. 132
		2 fragments of denier	10th C	?	Cologne	?	Sylloge 735	0.365g	Cut	NMAS, 1975
63	Skaill	Penny of St. Peter	c. 910	?	York	Type 5	no. 551	23.3 gr	Whole	Shetelig, 1940, 119
		Penny of Aethelstan	925-39	?	Chester	Type vi	no. 680	23 gr	Whole	Stevenson, 1966, xxii
		19 Samonid & Abbasid		?						Dolley, 1966, no. 84
		2 Ismail b Ahmad	896, 899	?	Tashkent	?	Sylloge 715; 716	2.855; 1.545g	1 whole; 1 cut & pierced	
		5 Nasr II b Ahmad	914-33	?	Tashkent	?	Sylloge 717-721	1.41;0.685;1.14;0.72;1.255g	4 cut; 1 pierced	
		2 Nasr II b Ahmad	922, 942	?	Samarqand	?	Sylloge 722; 723	0.98; 0.62g	Cut	
		1 Nasr II b Ahmad		?	Samarqand	?	Sylloge 724	0.47g	Cut	
		al Muqtadir	c. 916	Abu l-Abbas	Baghdad	?	Sylloge 725	2.685g	Cut	
		al Muqtadir	c. 930	Abu l-Abbas	Baghdad	?	Sylloge 726	2.81g	Cut	
		al Mustafki	c. 946	Abu Haan Mohammad	Baghdad	?	Sylloge 727	3.91g	Cut	
64	Caldale	300 coins of K. Canute	1025-35	Leofine; Lifinc	Dover; Lincoln;	Type xvi	no. 790	16.3;16.2;16.9;16.5;17.5;	Whole ?	Shetelig, 1940
		114 in BM, all type xvi		Crucan; Mildurf;	York; London			13.1 gr		Stevenson, 1966, xviii
				Wuinoth; Edwine						Dolley, 1966, no. 152
51	Brough of Birsay	2 pennies of Aethelred II	978-1016	Edric; Mana	Cambridge; Lincoln	Crux iiia; last sml cross	nos. 770; 777	?; 0.91 gr	Broken	Stevenson, 1986
		Penny of Eadgar	959-975	Agulf	?	Type 1	no. 741	Not given	Not given	Hunter, 1986, 186
		Penny of Olav Kyrre	c. 1080	?	Norway	?		Not given	Not given	Stevenson, 1986
94	Deerness church	2 pennies of Edward I	c. 1280	?	?	?		Not given	Not given	Steedman, 1980 no.39
95	Newark	Penny of Anlaf Sihrtcsson	10th C	?	York	Triquetra type	no. 540	Not given	Not given	Brothwell, 1977, 182
		Penny of Eadred	946-955	Aelfisige	?	Type i	no. 724	Not given	Not given	Stevenson, 1986, no.5

Appendix 4 - Exchange goods found at Viking and Late Norse sites in Orkney

Site details			Goods indigenous to Orkney									Foreign goods								Totals			
Site	Exc	Type	wood	stone	Lime	pot	clay	glass	Fe	Pb	peat	plant	animal	marine	steatite	coin	Ag	Au	amb	jet	pot	wood	Cu	LDT	IIT	Local	Loc
1	E	A	1	1	0	1	0	0	1	0	0	1	1	1	1	0	0	0	0	0	1	0	1	3	1	7	C
2	E	C	0	1	0	0	0	0	0		1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	C
3	E	B	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	2	C
6	E	B	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	2	I
7	E	A	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	4	C
8	E	D	0	1	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1	3	0	4	
9	E	B	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2	
10	E	D	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
11	E	D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	3	1	0	
12	E	D	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
13	E	A	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2	I
14	N	A	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	3	C
15	E	B	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	2	
16	N	A	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	4	C
17	N	C	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2	C
18	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	C
19	E	E	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	3	L
20	N	C	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
21	E	A	1	1	1	1	0	0	1	1	0	1	1	1	1	0	0	0	0	0	1	1	1	4	2	8	C
22	E	D	0	0	0	0	0	1	1	0	0	0	1	0	0	0	1	1	0	0	0	0	1	3	1	3	
23	E	D	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	C
24	E	D	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	1	2	0	3	C
25	N	E	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	C
26	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
27	E	A	0	1	0	0	0	0	1	0	0	1	1	1	1	0	1	1	0	0	0	0	1	4	0	5	C
28	E	D	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	2	0	1	C
29	E	C	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
30	E	D	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	C
31	E	D	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	2	0	1	C

Appendix 4 - Exchange goods found at Viking and Late Norse sites in Orkney

Site	Exc	Type	wood	stone	Lime	pot	clay	glass	Fe	Pb	peat	plant	animal	marine	steatite	coin	Ag	Au	amb	jet	pot	wood	Cu	LDT	IIT	Local	
32	E	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
33	N	A	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	2	C
34	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
35	E	A	0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	I
37	E	A	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	3	C
38	N	A	0	1	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	3	I
39	E	A	b	1	0	1	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	1	2	1	6	C
40	E	E	0	1	0	1	0	0	1	0	0	1	1	1	0	1	1	0	0	0	0	0	1	3	1	6	C
41	N	A	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	5	C
43	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
44	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	I
45	E	D	1	1	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2	4	I
46	E	D	1	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0	1	1	3	5	C
47	E	D	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	C
49	E	A	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	2	3	C
50	E	A	0	1	0	1	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	C
51	E	A	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	1	1	4	2	6	C
52	E	E	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	8	C
53	E	D	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	C
54	E	A	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	C
55	N	E	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	C
56	E	D	1	1	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	2	C
57	N	E	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	C
58	E	D	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	C
59	E	D	1	1	0	1	0	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	3	C
60	E	A	1	1	1	0	0	0	1	0	1	1	1	1	0	0	0	0	1	0	0	1	1	3	2	8	C
61	E	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	C
62	E	D	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0	1	C
63	E	B	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0	1	
64	E	B	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0	0	C
65	E	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	

Appendix 4 - Exchange goods found at Viking and Late Norse sites in Orkney

Site	Exc	Type	wood	stone	Lime	pot	clay	glass	Fe	Pb	peat	plant	animal	marine	steatite	coin	Ag	Au	amb	jet	pot	wood	Cu	LDT	IIT	Local
66	E	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
67	E	D	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3 L
68	E	D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0
69	E	A	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 C
70	E	B	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0 I
71	E	D	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	4 C
72	E	D	?0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
73	N	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 C
74	E	D	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	2 I
75	N	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0 C
76	N	B	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0 I
77	N	B	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0
78	N	B	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1 C
79	E	D	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	2 I
80	E	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 C
81	E	F	0	1	0	1	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	2	1	5 C
82	E	F	0	1	0	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	5 L
83	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 C
84	E	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 C
85	E	D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	3	0	0 C
86	E	A	0	1	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	1	3	1	4 C
89	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1 C
90	N	E	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 C
93	E	A	0	1	0	1	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	6 C
94	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1 C
95	E	E	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1 C
96	E	D	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1 C
97	E	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 C
98	E	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 C
99	E	F	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	4 C
100	E	A	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3 L

Appendix 4 - Exchange goods found at Viking and Late Norse sites in Orkney

Site	Exc	Type	wood	stone	Lime	pot	clay	glass	Fe	Pb	peat	plant	animal	marine	steatite	coin	Ag	Au	amb	jet	pot	wood	Cu	LDT	IIT	Local	
102	N	B	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	L
103	N	B	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	L
104	N	B	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	L
105	N	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
106	N	C	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
107	N	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	I
108	N	A	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	C
109	N	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
110	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	C
112	N	C	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
113	N	B	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	L
134	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
135	E	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
136	E	A	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	C
137	N	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	C
139	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
140	N	D	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2	C
143	N	C	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	I
144	E	E	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	3	C
145	E	D	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	C
146	N	C	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	I
147	N	A	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2	C
148	N	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	C
149	E	A	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	C
150	N	A	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	C
152	N	B	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	C
153	N	A	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	C
154	N	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
156	E	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	L
157	N	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
158	N	B	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	

Appendix 4 - Exchange goods found at Viking and Late Norse sites in Orkney

Site	Exc	Type	wood	stone	Lime	pot	clay	glass	Fe	Pb	peat	plant	anima	marine	steatite	coin	Ag	Au	amb	jet	pot	wood	Cu	LDT	IIT	Local	
159	N	B	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
160	N	A	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	C
161	E	E	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	C
162	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
163	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
164	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
165	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	L
166	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	L
167	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	L
168	N	C	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
169	E	C	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	C
170	N	E	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
171	N	A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
174	E	A	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	C
175	N	A	0	1	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	5	L
176	E	C	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
177	N	B	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	C
179	E	D	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	C
180	E	D	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	C
182	N	A	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	3	C
183	N	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	C
184	N	A	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	C
Totals			10	100	7	20	2	14	31	6	7	12	41	41	19	10	11	6	6	2	2	5	28	91	41	280	
Percentages			3	26	2	5	0	4	8	2	2	3	11	11	5	3	3	2	2	1	1	1	7	22	10	68	
% indigenous =			3	34	2	7	1	5	11	2	2	4	14	14													
Total number of sites = 134									Total no. of imports = 91					% imports =		21	11	12	7	7	2	2	6	32			
Total no. of materials = 380																											
Site = gazetteer no.									LDT = long distance transport																		
Exc = excavated or not									IIT = Inter-island transport																		
Type = Class of site: settlement etc.									Local = Goods produced locally																		
amb = amber									Loc = Location - coastal, lochside or inland																		

Appendix 5 - Viking boat finds in the British Isles

1. Two boat stems from a bog on Eigg, Hebrides (NMAS).
2. Boat grave at Kiloran Bay, Colonsay, Hebrides (NMAS. Reappraisal in progress; Schetelig [1907]).
3. Boat grave at Ardkinish, Colonsay, Hebrides (NMAS FC 190-1).
4. Boat grave at Pierowall, Westray, Orkney.
5. Boat grave at Gordon Bay, Argyll (Ardnamurchan, West Highlands Museum, Fort William).
6. Boat grave at Carn Nan Bharraich, Oronsay, Hebrides.
7. Boat grave at Lochan Kill Mhor, Oronsay, Hebrides (NMAS IT 84).
8. Boat grave at Cnon-Nan-Gill, Colonsay, Hebrides.
9. Boat grave at Tote, Sheabost, Skye.
10. Boat grave at Knoc-y-doonee, Isle of Man (Antiq. J., 1930, 10: 126-7).
11. Possible boat stem at Tormore, Arran.
12. Boat grave, Westness 1, Rousay, Orkney.
13. Boat grave, Westness 2, Rousay, Orkney.
14. Boat grave, Scar, Burness, Sanday, Orkney.
15. Cremated boat burial, Lamlash, Arran (PSAS, 1909, 43: 371).
16. Various boat and ship timbers, Dublin (McGrail, 1993).

Abbreviations:

NMAS - National Museum of Antiquities, Queen Street, Edinburgh. (Followed by catalogue accession numbers where known).

Source, unless otherwise stated, Shetelig (1940).

The standard of recording is variable. Many sites are thought to be boat burials on the basis of a few rivets.

Glossary

Beam: (a) A structural timber in a ship; (b) The widest point across a vessel's hull.
Beamy: A boat which has a length to beam ratio of less than 2.6.
Bilge: The region between the sides and the bottom of a boat.
Bordland: Estates of the Earls of Orkney which were exempted from taxation.
Bulkhead: A transverse partition in a boat.

Caulk: To insert material between two members on a boat to make the junction watertight.
Centre of maritime culture: Term used by Westerdahl (1989) to describe settlements which grew up at transition points between the sea and rivers or lochs.
Clench: To deform the end of a fastening so that it cannot be drawn out - usually done over a *rove*.
Clinker built: Boat building in which the *strakes* are overlapped - the upper *strake* is usually outboard of the lower *strake*.
Coastal communities: Term used by Muckelroy (1978) to describe groups of people living near the sea characterised by their maritime activities: boatbuilding, naval warfare and maritime trade.
Coastal zone: Variously defined by Westerdahl (1989) as a zone lying to landward of the *waterfront zone*, between one andfifty kilometres from the shore and by Sognnes (1981) as a geographical area up to five kilometres from the sea.
Crossbeam: A timber extending across the boat.
Cultural landscape: The landscape as modified by human occupation.

Færing: A four-oared rowing boat.
False keel: A fitting to the bottom of the keel to increase its penetration and to prevent wear when the boat is beached.
Farm mound: Artificial mounds created through continuous occupation, deposition of refuse and blown sand, found beneath or close to modern farms.
Fittocks and halfocks: A system of *timbering* where *ribs* are alternately fastened to groups of upper and then lower *strakes*.
Fourareen/forern: A four-oared boat used in Shetland.

Garboard: The *strake* fitted into or next to the *keel*.
Greenheart: An Orcadian term for a *false keel*.
Grommet: Rope in the form of a ring, often used to hold oars in place.

Hogback: A distinctively carved stone grave cover inn the shape of a Viking longhouse, often with a tegulated roof and muzzled bears at each end.
Honeyspot: A breasthook or horizontal *knee* at the *stem* of a boat.

Inland zone: The area lying to landward of the *coastal zone*.

Keel: Main longitudinal strength member upon which a boat's hull is constructed.
Knee: A crook bracketing two members together.

Leidang: A naval levy system described in historical sources.
Lines: Drawing to show the shape of a boat's hull.

Maills: A form of tax.

Naust (noost or noust): A boat house or shelter.
Ness yole: A type of vernacular boat in Shetland.
Nordic: A boat building tradition where the boat is built from overlapping wooden planks on a keel. The boat is usually double-ended and symmetrical about amidships.
Normal: A boat which has a length to beam ratio of between 2.6 and 3.75 and a beam to depth ratio of between 2 and 3.

Portage: A site where a boat might be hauled overland to avoid a difficult passage.

Rib: A simple form of frame.
Rove: A metal washer.
Rowlock: A contraption used for holding an oar in place.

Scarf: A tapered or wedge shaped joint.
Scat: A form of tax.
Shallow: A boat which has a beam to depth ratio of more than 3.
Shell: Technique of constructing a boat where the hull is constructed first and then reinforced by an internal frame.
Sixareen/sixern: A six-oared boat used in herring fishing in modern Shetland.
Stem: (a) the timber which closes the hull of a boat at one or both ends; (b) the front of a vessel.
Strake: A plank or run of planks stretching from stem to stern.
Stringer: A longitudinal strength member along the inside of the planking.

Teinds: A form of tax.
Timber: A term for *ribs* and *frames*, usually meaning a floor timber.
Thing: The Norse political and adminstrative assembly.
Thole: A projection above sheer level against which an oar may be pivoted.
Thwart: A transverse member used as a seat.
Transom: A transverse partition at the *stem* or stern of the boat.
Treenail/trenail/trunnel: A wooden peg.

Urisland: A unit of land related to *scat* values recorded in rentals.

Waterfront zone: The area immediately bordering a coast or river.

Yole: A small boat with sprit sails, derived from the Old Norse term *yolle*. These boats were used in Orkney and Shetland.

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